

Final Revision on Unit

1

1

Definitions (or scientific terms) :

1. Mendeleev's periodic table :	<ul style="list-style-type: none"> * It is the first real periodic table for classifying elements. * It is a table in which the elements are arranged in an ascending order according to their atomic weights.
2. Moseley's periodic table :	It is a table in which the elements are arranged in an ascending order according to their atomic numbers.
3. Modern periodic table :	It is a table in which the elements are arranged in an ascending order according to the atomic numbers and the way of filling the energy sublevels with electrons.
4. The group :	It is a partition in the periodic table containing elements having similar properties in vertical column.
5. The period :	It is a partition in the periodic table containing elements having the same number of energy levels in horizontal row.
6. Atomic number :	<ul style="list-style-type: none"> * It is the number of protons inside the nucleus of the atom of an element. * It is the sum of the numbers of electrons rotating in energy levels around the nucleus of the atom of an element.
7. Picometer :	<ul style="list-style-type: none"> * It is the measuring unit of the atomic size of the element. * It is a part from million of the million part of a metre.
8. Electronegativity :	It is the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.
9. Polar compounds :	They are covalent compounds in which the difference in electronegativity between their elements is relatively high.
10. Metals :	<ul style="list-style-type: none"> * They are the elements which have less than four electrons in their outermost energy levels. * They are the elements which tend to lose their outermost electrons and change into positive ions during the chemical reaction.
11. Positive ion :	It is an atom of metallic element that loses one electron or more during the chemical reaction.
12. Nonmetals :	<ul style="list-style-type: none"> * They are the elements which have more than four electrons in their outermost energy levels. * They are the elements which tend to gain electrons and change into negative ions during the chemical reaction.

13. Negative ion :	It is an atom of nonmetallic element that gains an electron or more during the chemical reaction.
14. Metalloids :	They are the elements which have the properties of both metals and nonmetals, like Boron, Silicon, Germanium, Arsenic, Antimony and Tellurium.
15. Basic oxides :	They are metallic oxides, some of them dissolve in water forming alkaline solutions.
16. Acidic oxides :	They are nonmetallic oxides which dissolve in water forming acidic solutions.
17. Chemical activity series :	It is a series in which metals are arranged in a descending order according to their chemical activity.
18. Hydrogen bond :	It is a weak electrostatic attraction force that arises between the molecules of polar compounds.
19. Water pollution :	It is addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.

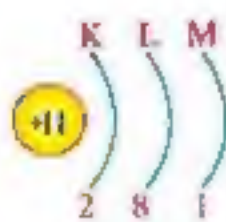
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Important laws and solved problems :**1 Determination the location of elements in the modern periodic table.**

- The period number of the element = number of energy levels occupied by electrons in its atom.
- The group number of the element = number of electrons in the outermost energy level in its atom.

Problem Locate the position of the following elements in the modern periodic table :1. $_{11}\text{Na}$ 2. $_{20}\text{Ca}$ 3. $_{10}\text{Ne}$ **Solution**

1.



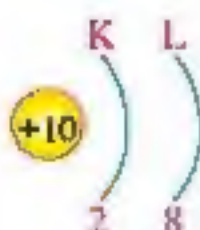
Period (3)
Group (1A)

2.



Period (4)
Group (2A)

3.



Period (2)
Group (0)

- 2 The atomic number of an element = the sum of the numbers of electrons rotating in its energy levels.

Problem Calculate the atomic number of :

1. Element (X) which locates in period (2) and group (3A).
2. Element (Y) which locates in period (3) and group (0).

Solution

1. Element (X)

- ∴ It lies in period (2).
- ∴ Its electrons are distributed in two energy levels.
- ∴ It lies in group (3A).
- ∴ The outermost energy level contains 3 electrons.
- ∴ The atomic number of element (X) = $2 + 3 = 5$

K	L
2	3

2. Element (Y)

- ∴ It lies in period (3).
- ∴ Its electrons are distributed in three energy levels.
- ∴ It lies in group zero.
- ∴ The outermost energy level contains 8 electrons.
- ∴ The atomic number of element (Y) = $2 + 8 + 8 = 18$

K	L	M
2	8	8

3 Water electrolysis :

- The volume of hydrogen gas = $2 \times$ the volume of oxygen gas.

Problem Calculate the volume of hydrogen gas that evolves at the negative pole if you know that the volume of oxygen gas that evolves at the positive pole of Hofmann's voltameter is 4 cm^3 .

Solution

$$\text{Volume of hydrogen gas} = 2 \times \text{volume of oxygen gas} = 2 \times 4 = 8 \text{ cm}^3$$

3

Importance or uses :

Item	Importance or use
1. Baking powder :	Cleaning of silver tools.
2. Sodium (liquid state) : (metal)	It is used in transferring heat from inside the nuclear reactor to outside. This heat is used to obtain the vapour energy required to generate electricity.

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3. Cobalt ^{60}Co : (transition element)	It is used in food preservation.
4. Silicon $_{14}\text{Si}$: (metalloid)	Silicon slides are used in the manufacture of electronics such as computer.
5. Liquefied nitrogen : (nonmetal)	It is used in the preservation of cornea of the eye.
6. Hofmann's voltameter :	It is used in electrolysis of acidified water.

4

Important tables :

1 Important numbers :

1. No. of elements in Mendeleev's periodic table.	67
2. No. of elements in modern periodic table.	118
3. No. of available elements in Earth's crust.	92
4. No. of groups of modern periodic table.	18
5. No. of periods of modern periodic table.	7
6. The angle between two single covalent bonds in water molecule.	104.5°
7. Boiling point of water.	100°C
8. Freezing point of water.	0°C
9. Boiling point of liquid nitrogen.	-196°C

2 The reaction of metals with water depends on the position of the metal in chemical activity series :

Metals	Reaction with water
Potassium K Sodium Na	They react instantly with water and hydrogen gas is evolved which burns with a pop sound.
Calcium Ca Magnesium Mg	They react very slowly with cold water.
Zinc Zn Iron Fe	They react with hot water vapour at high temperature only.
Copper Cu Silver Ag	They don't react with water.

PART

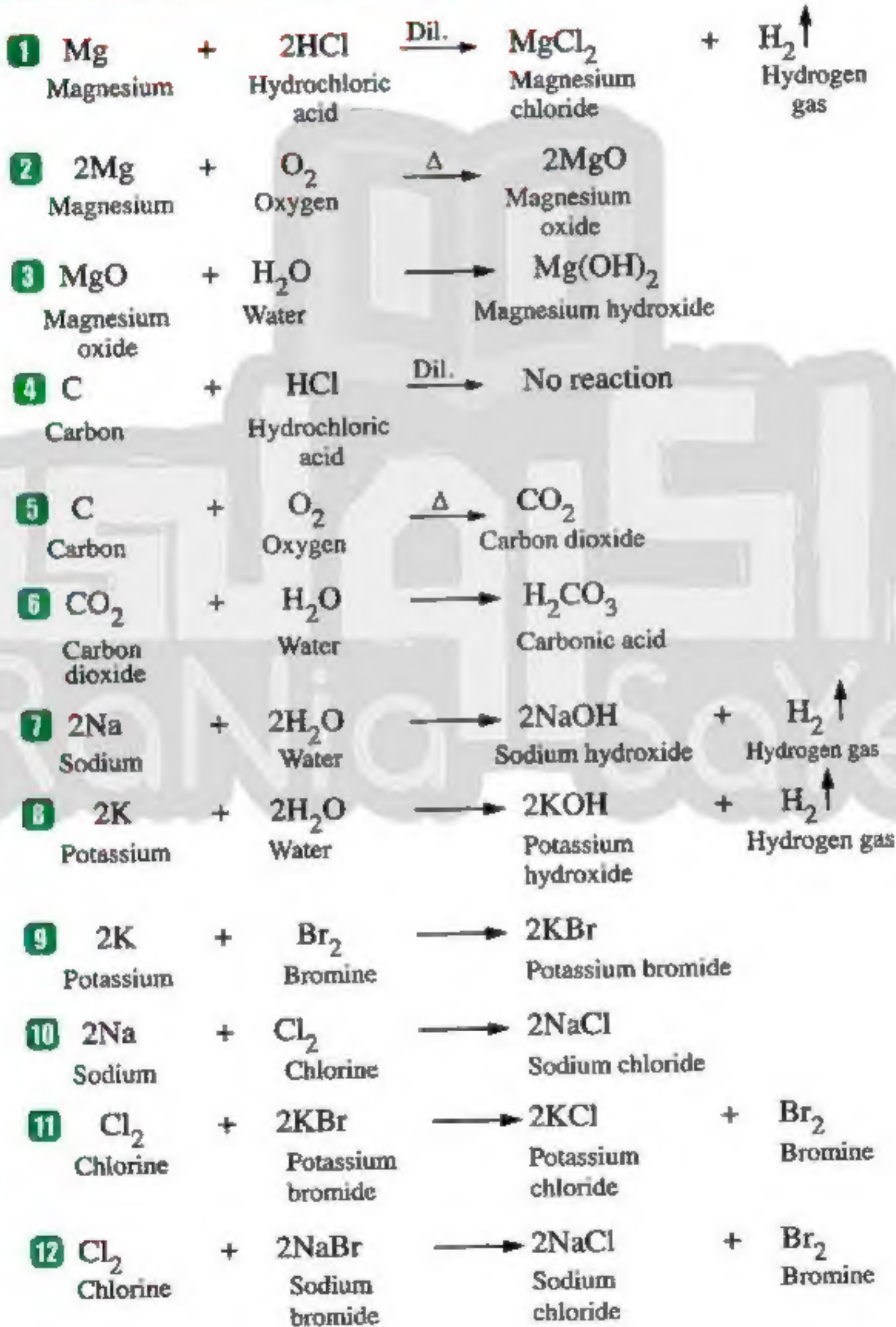
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3 The physical state of halogens :

Halogen :	Fluorine	Chlorine	Bromine	Iodine
Physical state	Gas		Liquid	Solid

5

Important equations :





6

Give reasons for:

- Scientists thought about classifying elements according to their properties.**
To facilitate their study and find a relationship between elements and their chemical and physical properties.
- Mendeleev left gaps (spaces) in his periodic table.**
Because he predicted the discovery of new elements.
- Mendeleev had to make disorder in the arrangement (in the ascending order) of atomic weights of some elements.**
To put these elements in groups that suit their properties.
- Mendeleev had to consider the isotopes of one element are different elements.**
Due to the difference in their atomic weights.
- Mendeleev had to put more than one element in one cell.**
Due to the similarity in their properties.
- Moseley arranged elements in an ascending order according to their atomic numbers.**
Because he discovered after studying x-rays properties that the periodic properties of elements are related to their atomic numbers and not their atomic weights.
- Mendeleev classified the elements of each group into two subgroups.**
Due to the differences between their properties.
- Elements of the same group have similar properties.**
• **Properties of elements ($_{12}\text{Mg}$) and ($_{20}\text{Ca}$) are similar.**
Because their atoms have the same number of electrons (two electrons) in the outermost energy level.
- Both sodium ($_{11}\text{Na}$) and potassium ($_{19}\text{K}$) are located in the same group.**
Because their atoms have the same number of electrons (one electron) in the outermost energy level.
- Both lithium ($_{3}\text{Li}$) and nitrogen ($_{7}\text{N}$) are located in the same period.**
Because their atoms have the same number of energy levels (2 levels) occupied by electrons.
- Scientists cannot discover a new element between sulphur ($_{16}\text{S}$) and chlorine ($_{17}\text{Cl}$).**
Because the atomic number of each element is an integer and it increases than its preceding one in the same period by one.

12. • In periods, by increasing the atomic number, the atomic size decreases.

• The atomic size of (${}_3\text{Li}$) is greater than that of (${}_4\text{Be}$).

Because the attraction force between the positive nucleus and the outermost electrons increases through the period by increasing the atomic number (by going from left to right).

13. • By increasing the atomic number within groups, the atomic size increases.

• The atomic size of (${}_{11}\text{Na}$) is greater than that of (${}_3\text{Li}$).

Due to the increase of the number of energy levels through the group by increasing the atomic number (on going from up to down).

14. Water and ammonia are polar covalent compounds.

Because the difference in electronegativity between the elements forming their molecules is relatively high.

15. Water is more polar than ammonia.

Because the difference in electronegativity between oxygen and hydrogen is greater than that between nitrogen and hydrogen.

16. Sodium (${}_{11}\text{Na}$) atom tends to form a positive ion, while chlorine (${}_{17}\text{Cl}$) atom tends to form a negative ion.

Because sodium atom loses the outermost electron forming positive ion, while chlorine atom gains an electron forming negative ion.

17. Both sodium ion (Na^+) and fluoride ion (F^-) have the same number of electrons.

Because during chemical reactions, sodium (${}_{11}\text{Na}$) atom loses one electron and fluorine (${}_9\text{F}$) atom gains one electron so, the number of electrons becomes 10 electrons in both ions.

18. In metallic groups, the metallic property increases as we go from the top to the bottom.

Because the atomic size increases by increasing the atomic numbers in the same group.

19. In nonmetallic groups, the nonmetallic property decreases as we go from the top to the bottom.

Due to the decrease of electronegativity by increasing the atomic numbers in the same group.

20. • Cesium (Cs) is the most metallic element.

• Cesium (Cs) is the most active metal in the periodic table.

Because it has the largest atomic size, so it can lose its valency electrons easily.

21. Metallic property of potassium element (${}_{19}\text{K}$) is more than that of sodium element (${}_{11}\text{Na}$).

Because the metallic property increases gradually by increasing the atomic numbers of the elements in the same group.

22. Nonmetallic property of oxygen element (${}_8\text{O}$) is more than that of nitrogen (${}_7\text{N}$).

Because the nonmetallic property increases gradually by increasing the atomic numbers of the elements in the same period.

- 23. We can use dilute HCl to differentiate between carbon and magnesium.**

Because magnesium is a metal which reacts with dilute HCl and hydrogen gas evolves, while carbon is a nonmetal which doesn't react with HCl.



- 24. Solution of magnesium oxide in water turns the violet litmus solution into blue.**

Because magnesium oxide dissolves in water giving magnesium hydroxide (alkaline solution) which turns litmus solution into blue.



- 25. We can use water to differentiate between calcium and zinc.**

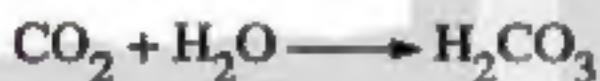
Because calcium can react with cold water, while zinc reacts with hot water vapour at high temperature only.

- 26. Nonmetal oxides are known as acidic oxides.**

Because they dissolve in water forming acids.

- 27. Solution of carbon dioxide in water turns the violet litmus solution into red.**

Because it dissolves in water forming carbonic acid which turns litmus solution into red.



- 28. Elements of group (1A) are known as alkali metals.**

Because they react with water forming alkaline solutions.

- 29. Lithium floats on water surface, while cesium sinks in water.**

Because the density of lithium is less than that of water, while the density of cesium is greater than that of water.

- 30. Alkali metals are monovalent elements.**

Because their atoms have only one electron in their outermost energy level.

- 31. Sodium is kept under the surface of kerosene.**

To prevent it from the reaction with moist air as it is an active metals.

- 32. Lithium (${}_3\text{Li}$) is the least active metal in group (1A).**

Because it has the least atomic size in group (1A).

- 33. Sodium fires are not put off with water.**

Because sodium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.



- 34. Potassium is more active than sodium.**

Because the atomic size of potassium is larger than that of sodium.

- 35. The reaction of potassium with water is more strongly than that of sodium.**

Because potassium is more active than sodium.

36. Elements of group (7A) are known as halogens.

Because they react with metals forming salts, where halogens mean "Forming salts".

37. Halogens are monovalent.

Because they tend to gain one electron during chemical reaction.

38. • Halogens exist in the form of diatomic molecules.

• Halogens do not exist in nature in elementary state.

Because they are active elements.

39. Bromine can't replace chlorine in its salt solution.

Because bromine is less active than chlorine.

40. Liquid sodium is used in nuclear reactors.

Because it is a good conductor of heat which transfers the heat from inside the nuclear reactor to outside it to obtain vapour energy which generate electricity.

41. (^{60}Co) is used in food preservation.

Because it emits gamma rays which prevent the reproduction of microbial cells.

42. Silicon is used in the manufacture of electronics.

Because it is semi-conductor, its ability to conduct electricity depends on the temperature.

43. The importance of liquefied nitrogen in the medical fields.

Because it is used in the preservation of cornea of the eye.

44. Liquefied nitrogen is used in preservation of cornea of eye.

Due to the decrease of its boiling point (-196°C).

45. Water has several uses.

Because it used in agricultural fields, industrial fields and personal fields.

46. The high boiling point of water.

Due to the presence of hydrogen bonds between water molecules.

47. The presence of hydrogen bonds between water molecules.

Because water is a polar compound due to the higher electronegativity of oxygen with respect to hydrogen.

48. Water has the ability to dissolve most ionic compounds.

Because water is a good polar solvent.

49. Dissolving of sugar in water although it is from covalent compounds.

Because sugar molecules can make hydrogen bonds with water molecules.

50. Oil doesn't dissolve in water.

Because it is a covalent compound which can't make hydrogen bonds with water, so it doesn't dissolve in it.

51. Ice floats on the water surface.

Because the density of ice is less than the density of water.

52. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.
Because when the temperature of water decreases than 4°C , it forms a layer of ice which floats on water surface and this provides the creatures the chance to still alive.
53. On putting a glass bottle completely filled with water in a freezer, it will break.
Because when water freezes, its volume increases and the pressure inside the bottle increases.
54. Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.
Because pure water is a bad conductor of electricity, but acidified water conducts electricity.
55. The glowing of splint increases by approaching it to the anode of Hofmann's voltameter during electrolysis of acidified water.
Because oxygen gas which increases the glowing evolves at the anode.
56. Chemical water pollution is more dangerous than biological pollution.
Because chemical water pollution causes dangerous diseases such as the death of brain cells, blindness and liver cancer.
57. We should keep water free from any pollution.
To protect ourselves from dangerous diseases caused by water pollution.
58. It is dangerous to eat fish containing high concentration of lead.
Because this leads to death of brain cells.
59. Death of marine creatures in the water areas in which the water used in cooling the nuclear reactors.
Due to the separation of the dissolved oxygen from water.
60. We should not keep the tap water in plastic bottles.
Because plastic reacts with chlorine gas which is used as water disinfectant leading to the increase in the infection rates by cancer.

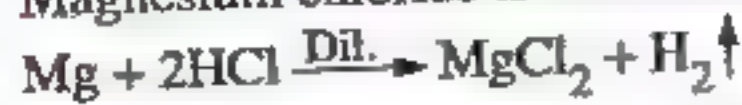
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What happens when ... ?

1. Increasing the atomic number in group (1A) [concerning the atomic size].
The atomic size increases.
2. A metallic atom loses one electron or more during the chemical reaction.
It changes into a positive ion.
3. A nonmetallic atom gains one electron or more during the chemical reaction.
It changes into a negative ion.
4. We go from up to down inside the group (1A).
The atomic number increases, the atomic size increases and the metallic property increases.

5. Adding dil. HCl to a piece of magnesium.

Magnesium chloride is formed and hydrogen gas evolves as bubbles.

**6. Burning a magnesium strip inside a test tube contains oxygen.**

It burns with a bright light and a substance (magnesium oxide) is formed.

**7. Dissolving magnesium oxide in water.**

It dissolves in water giving magnesium hydroxide.

**8. Adding the violet litmus solution to magnesium oxide.**

The solution turns into blue.

9. Adding the violet litmus solution to a jar containing a piece of burning coal.

The solution turns into red.

10. Putting a glass bottle filled with water in the freezer for a long time.

It will be broken.

11. Decreasing of water temperature to 4°C.

The water molecules are collected together by hydrogen bonds forming ice crystals of hexagonal shape and large volume.

12. Decomposing of water into its two elements by heating.

There isn't aqueous solutions inside the cells of living organisms.

13. Passing of electric current through Hofmann's voltameter containing acidic water.

The acidified water decomposes into oxygen gas evolves at the anode and hydrogen gas evolves at the cathode. The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume.

14. Pollution of water with animal and human wastes.

The infection by many diseases such as bilharzia, typhoid and hepatitis.

15. Storing water in plastic bottles.

Plastic reacts with chlorine gas (used as water disinfectant) leading to the increase in the infection rates by cancer.

16. Throwing synthetic cleaning substances in water.

This leads to increase the concentration of some elements causing great harms.

17. Increasing the ratio of arsenic in food.

It increases the infection rate by liver cancer.

18. Increasing the concentration of mercury in drinking water.

It causes blindness.

19. Eating fish contains high concentration of lead.

It causes the death of brain cells.

8 Comparisons

1 Attempts of elements classification.

Mendeleev's periodic table	Moseley's periodic table	Modern periodic table
Elements are classified in an ascending order according to their atomic weights.	Elements are classified in an ascending order according to their atomic numbers.	Elements are classified in an ascending order according to : <ul style="list-style-type: none"> • their atomic numbers. • the way of filling the energy sublevels with electrons.

2 Main energy levels and energy sublevels.

Points of comparison	Main energy levels	Energy sublevels
• Their number in the heaviest atom known till now :	7	4
• They are symbolized by :	K , L, M, N, O, P and Q	s, p, d and f

3 s-block and p-block.

Points of comparison	s-block	p-block
• Its location in the periodic table :	on the left side	on the right side
• It includes :	two groups (1A) and (2A)	six groups (3A), (4A) , (5A), (6A) , (7A) and (0)


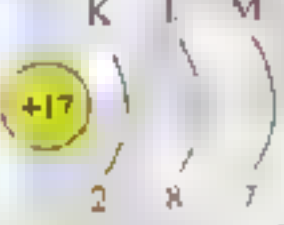
4 d-block and f-block.

Points of comparison	d-block	f-block
• Its location in the periodic table :	in the middle	below the periodic table.
• It includes :	transition elements	lanthanides and actinides.

5 Period and group.

Period	Group
<ul style="list-style-type: none"> - It includes elements of different properties. - Its elements have the same number of energy levels. - By increasing the atomic number for its elements : <ul style="list-style-type: none"> • The atomic size decreases. • The metallic property decreases till we reach metalloid, then the nonmetallic property increases. 	<ul style="list-style-type: none"> - It includes elements of similar properties. - Its elements have the same number of electrons in the outermost energy level. - By increasing the atomic number for its elements : <ul style="list-style-type: none"> • The atomic size increases. • The metallic property increases gradually as we go from top to bottom as in group (1A). • The nonmetallic property decreases gradually as we go from top to bottom as in group (7A).

6 Sodium ($_{11}\text{Na}$) element and chlorine ($_{17}\text{Cl}$) element.

Points of comparison	$_{11}\text{Na}$	$_{17}\text{Cl}$
• Electronic configuration of the atom :		
• Group no. :	(1 A)	(7 A)
• Period no. :	3	3
• Block :	s	p

7 The positive ion (cation) and the negative ion (anion) :

The positive ion (cation)	The negative ion (anion)
<ul style="list-style-type: none"> - It is an atom of a metallic element that lost one electron or more during the chemical reactions. - It carries positive charges equal to the number of lost electrons. - The number of energy levels in it is less than the number of energy levels in its atom. - The number of its protons is more than that of its electrons. - Its electronic structure is similar to that of the nearest preceding inert gas. - Ex. : Na^+, Mg^{+2}, Al^{+3} 	<ul style="list-style-type: none"> - It is an atom of a nonmetallic element that gained one electron or more during the chemical reactions. - It carries negative charges equal to the number of gained electrons. - The number of energy levels in it is equal to the number of energy levels in its atom. - The number of its electrons is more than that of its protons. - Its electronic structure is similar to that of the nearest inert gas that follows. - Ex. : Cl^-, O^{-2}, P^{-3}

8 Metals and nonmetals.

Metals	Nonmetals
<ul style="list-style-type: none"> - They are the elements which have less than four electrons in their outermost energy levels - They tend to lose electrons and change into (+ve) ions. - They are characterized by largest atomic sizes. - Some of them react with dilute acids forming salt of acid and hydrogen gas. - They react with oxygen forming basic oxides. 	<ul style="list-style-type: none"> - They are the elements which have more than four electrons in their outermost energy levels. - They tend to gain electrons and change into (-ve) ions. - They are characterized by smallest atomic sizes - They don't react with dilute acids. - They react with oxygen forming acidic oxides.

9 Basic oxides and acidic oxides :

Basic oxides	Acidic oxides
<ul style="list-style-type: none"> - They are metal oxides. - They are formed by the reaction of metal with oxygen. - Some of them dissolve in water giving alkalis. - Their solutions turn litmus solution into blue. - Ex. : MgO and Na_2O 	<ul style="list-style-type: none"> - They are nonmetal oxides. - They are formed by the reaction of nonmetal with oxygen. - They dissolve in water giving acids. - Their solutions turn litmus solution into red. - Ex. : CO_2

10 Fluorine (${}_9F$) and cesium (${}_{55}Cs$).

Points of comparison	Fluorine (${}_9F$)	Cesium (${}_{55}Cs$)
• The kind of the element :	Halogen.	Alkali metal.
• Its position in the table :	Period (2) and group (7A).	Period (6) and group (1A)
• Chemical activity :	Active nonmetal.	Active metal.

11 Alkali group and halogens group :

Alkali group	Halogens group
<ul style="list-style-type: none"> - They are located on the left side of the modern periodic table. - They are the first group (1A) of s-block. - They include the strongest metals. - They are good conductors of heat and electricity. 	<ul style="list-style-type: none"> - They are located on the right side of the modern periodic table. - They are elements of group (7A) in p-block. - They include the strongest nonmetals. - They are bad conductors of heat and electricity.

12 Natural and artificial environmental pollutants :

Natural pollutants	Artificial pollutants
<p>They arise from natural phenomenon such as :</p> <ul style="list-style-type: none"> - Volcanic eruptions. - Death of living creatures. - Lightning accompanying thunder storms. 	<p>They arise from different human activities such as :</p> <ul style="list-style-type: none"> - Burning coal and oil which leads to the formation of acidic rains and smog. - The overuse of chemical insecticides and fertilizers. - Throwing sewage and factories wastes and leakage of petroleum oil in the seas and rivers.

13 Kinds of artificial water pollution :

Points of comparison	Chemical pollution	Biological pollution	Radiant pollution	Thermal pollution
1. It originates from :	Discharging of factories residues and sewage in seas and rivers.	Mixing of animals and human wastes with water.	Dumping of atomic wastes in the oceans and seas.	Using some water areas in cooling the nuclear reactors.
2. Its harms :	<ul style="list-style-type: none"> * Blindness. * Liver cancer. * Death of brain cells. 	<ul style="list-style-type: none"> * Bilharzia. * Typhoid. * Hepatitis. 	_____	* Death of marine creatures.

9 Activities

Activity 1 Magnesium oxide is a basic oxide.

Steps :

- Ignite one end of a magnesium strip until it burns, then put it in a jar filled with oxygen gas.
- Add some drops of water with some drops of violet litmus solution to the produced substance.

Observations :

- Magnesium strip burns with a bright light and magnesium oxide is formed.
 - Litmus solution turns into blue.
- Magnesium oxide dissolves in water.

**Conclusion :**

- Magnesium oxide dissolves in water giving basic oxide which turns litmus solution into blue.

**ACTIVITY 2**

Reaction of magnesium with dilute acid.

**Step :**

Put a part of magnesium strip in a test tube and add some dilute hydrochloric acid (HCl).

**Observation :**

A gas evolves with bubbles.

**Conclusion :**

Magnesium reacts with dilute acid [HCl] giving magnesium chloride and hydrogen gas evolves.

**ACTIVITY 3**

Carbon dioxide is an acidic oxide.

**Steps :**

1. Burn a piece of coal in a burning spoon and put it after complete burning in a cylinder full of oxygen.
2. Add some water and drops of violet litmus solution to the cylinder.

**Observations :**

- The glowing increases.
- Carbon dioxide dissolves in water.
- The solution turns into red.

**Conclusion :**

Carbon dioxide dissolves in water giving acidic oxide which turns litmus solution into red.

**ACTIVITY 4**

Reaction of nonmetals [such as carbon with dilute acids.

**Steps :**

1. Put a piece of coal (carbon) in a test tube.
2. Add some dilute HCl to the tube.

PART

2

Observation :

No reaction takes place.

Conclusion :

Nonmetals [such as carbon] don't react with dilute acids.

ACTIVITY 5 Potassium is more active than sodium.**Steps :**

1. Put the sodium piece in a beaker containing some water *Fig. (a)*.
2. Repeat the above step using potassium instead of sodium *Fig. (b)*.

*Fig. (a)**Fig. (b)***Observations :**

- Both sodium and potassium react with water and hydrogen gas evolves which burns with a pop sound.
- The reaction of potassium with water is more strongly than that of sodium.

Conclusion :

Potassium is more active than sodium.

ACTIVITY 6 To prove that water is a good polar solvent.**Steps :**

1. Put an amount of water in three glass beakers.
2. Put a spoon of sugar in the first beaker and a spoon of table salt in the second and some drops of oil in the third with stirring.

Observation :

Both sugar and table salt dissolve in water, while oil doesn't dissolve.

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**Conclusion :**

Water is a good polar solvent so, it has a great ability to dissolve most ionic compounds such as table salt (sodium chloride).

- Water can also dissolve some covalent compounds such as sugar that can form hydrogen bonds with it.
- Some covalent compounds such as oil can't dissolve in water as they can't form hydrogen bonds with water.

**ACTIVITY 7**

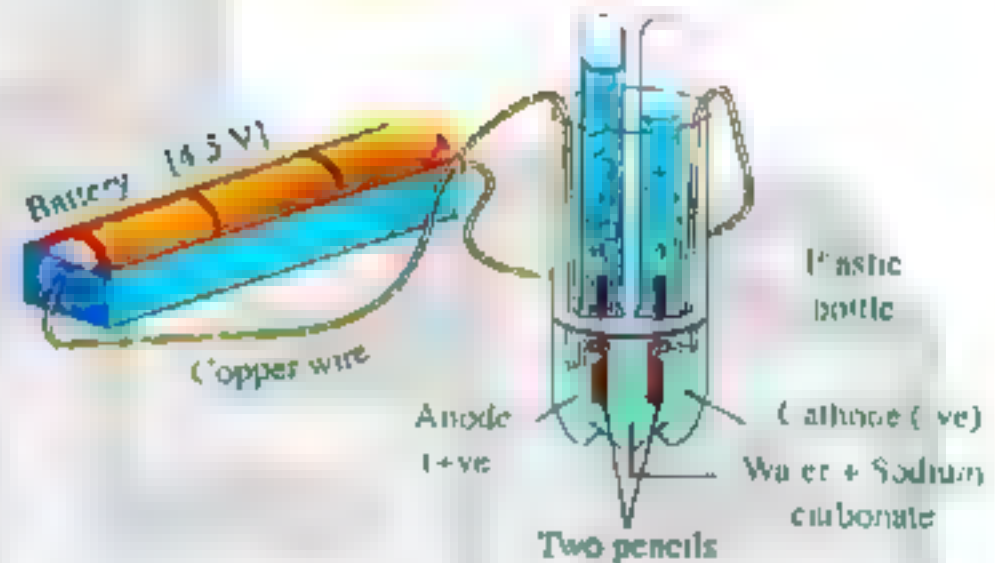
Potassium is more active than sodium.

**Steps :**

Connect the circuit as shown in the figure, then close it for 10 min. :

1. Compare between the volume of the evolved gas above the negative pole (cathode) and the volume of the evolved gas above the positive pole (anode).

2. Approach a glowing splint to the gas evolved at both cathode and anode.

**Observations :**

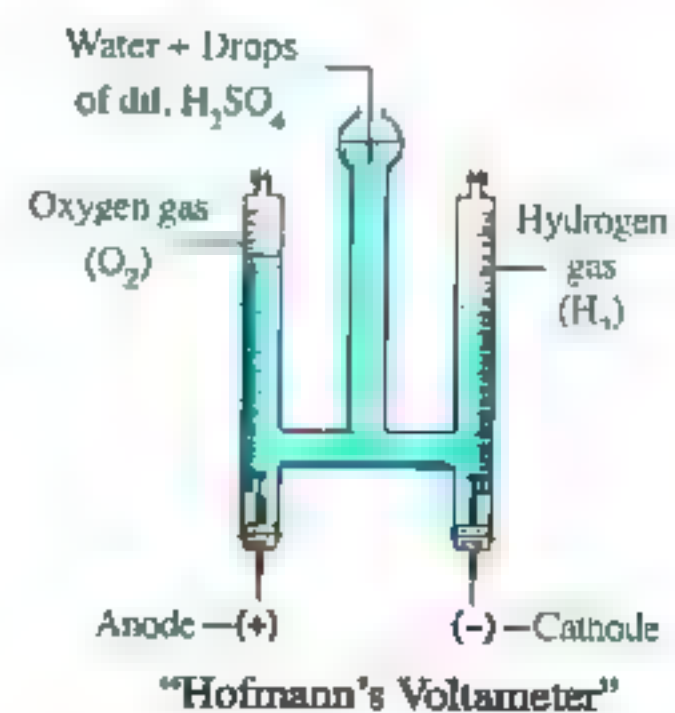
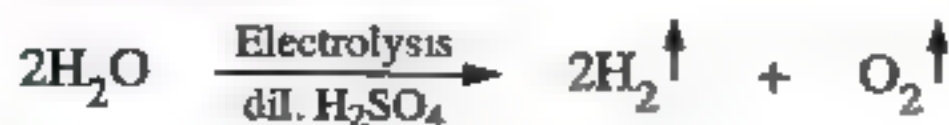
1. The volume of the evolved gas above the cathode doubled the volume of the evolved gas above the anode.
2. The evolved gas above the anode makes the glowing splint more glowing, while the evolved gas above the cathode burns with a blue flame and makes a pop sound.

**Conclusion :**

The acidified water decomposes by electricity into :

- Oxygen gas evolves at the **anode**.
- Hydrogen gas evolves at the **cathode**.

- The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume because water molecule (H_2O) is composed of two hydrogen atoms and one oxygen atom.



Lesson 1 Attempts of Elements Classification :

1 Mendeleev :

- He arranged elements of similar properties in vertical columns (groups).
- He arranged elements in an ascending order according to their **atomic weights** in horizontal rows (**periods**) which were published in his book "Principles of Chemistry" in 1871
- He classified the elements of each group into two subgroups (A and B).
- *He discovered that :*
- The atomic weights of elements increase (in non-uniform way) on moving from the left side of the table to the right side in horizontal rows (**periods**).
- The properties of elements were repeated **periodically** by the beginning of each new period.

* *Advantages of Mendeleev's table :*

1. He left gaps (empty cells) in his table predicting the discovery of new elements.
2. He corrected the atomic weights of some elements which were estimated wrongly.

* *Disadvantages of Mendeleev's table :*

1. He had to make disorder in the arrangement in the ascending order of atomic weights of some elements to put them in groups that suit their properties.
2. He had to consider the isotopes of one element are different elements due to the difference in their atomic weights so, he had to put more than one element in one place (cell) of his table.

2 Rutherford :

He discovered that the nucleus of the atom contains positively charged protons.

3 Moseley :

- He discovered after studying X-rays properties that the periodic properties of elements are related to their atomic numbers and not to their atomic weights.

* *The most important modifications of Moseley on Mendeleev's table :*

1. He arranged elements in an ascending order according to their **atomic numbers**.
2. He added zero (0) group which includes inert (noble) gases to the table.
3. He specified a place below the table for lanthanides and actinides elements.

4 Bohr : He discovered the main energy levels of the atom.

5 Modern periodic table :

Elements are classified in an ascending order according to :

1. Their atomic numbers.
2. The way of filling the energy sublevels with electrons.

Lesson 2 Graduation of the Properties of Elements in the Modern Periodic Table :

- The atomic radius is used as a measure for the atomic size of the atom and its measuring unit is **picometre**.

By increasing the atomic number

- The atomic size decreases.
- The nonmetallic property increases.
- The metallic property decreases.

- The atomic size increases.
- The metallic property increases.
- The nonmetallic property decreases.

1	2																	18
		3	4	5	6	7	8	9	10	11	12		13	14	15	16	17	

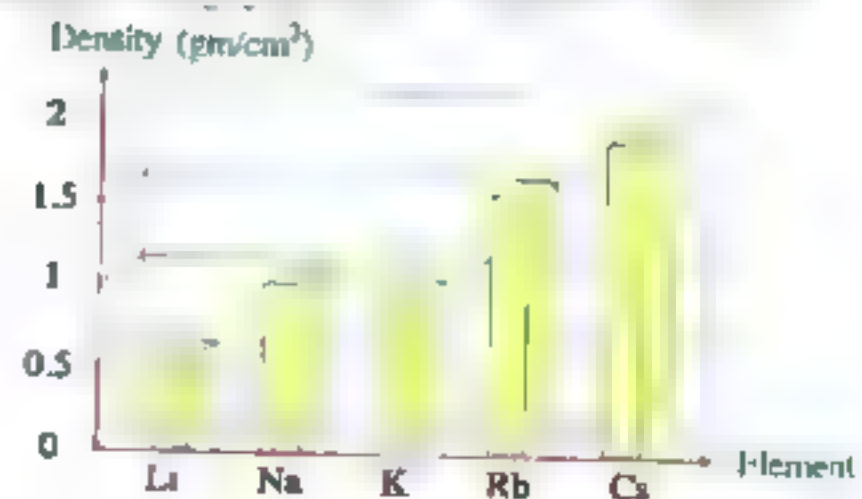
Metal
 Nonmetal
 Metalloid
 Inert gas

- Cs is the most metallic element in group (1A).
- Li is the least metallic element in group (1A).
- The most nonmetallic element is found in group (7A).

Lesson 3 Main Groups in the Modern Periodic Table :

The density of alkali metals :

- Most of them have low density.
 - (Li), (Na) and (K) float on the water surface.
 - (Rb) and (Cs) sink in water.



Lesson 4 Water :

- Importance of water :
 - Water is very important for all living organisms and it has several uses in :
 - Agricultural fields.
 - Industrial fields.
 - Personal fields.

• Structure of water :

- Water molecule is formed by combination of one oxygen atom (O) with two hydrogen atoms (H) by two *single covalent bonds*, the angle between them is 104.5°
- Due to the higher electronegativity of oxygen with respect to hydrogen, polar water molecules are linked together by "*hydrogen bonds*".



• Properties of water :

1 Physical properties :

1. Water exists in three states which are solid state (ice), liquid state (water) and gaseous state (water vapour).
2. Water is a good polar solvent for most ionic compounds and some covalent compounds such as sugar.
3. Pure water boils at 100°C and freezes at 0°C .
4. Water density decreases on freezing.

2 Chemical properties :

1. Water has a neutral effect on litmus paper.
2. Electrolysis of water.

• Protection of water from pollution :

1. Preventing of getting rid of sewage, wastes of factories and dead animals in rivers or canals.
2. Developing the stations of water purification and do a periodical analysis to water used in drinking.
3. Disinfection of the drinking water tanks which are found on the roofs of buildings in a periodical manner.
4. Don't store the tap water in empty plastic bottles, because plastic reacts with chlorine gas (used as water disinfectant) leading to the increase in the infection rates by cancer.
5. Spreading environmental awareness among people to protect water from pollution.

Final Revision on Unit

2

Definitions for scientific terms

1. Atmospheric envelope of the Earth :	It is a gaseous envelope rotating with the Earth around its axis and it extends about 1000 km. above sea level.
2. Atmospheric pressure :	It is the weight of air column of an atmospheric height on a unit area (1 m^2).
3. Normal atmospheric pressure :	It is the atmospheric pressure at sea level and it equals 1013.25 mb
4. Isobar :	It is curved lines that join the points of equal pressure in atmospheric pressure maps.
5. Tropopause :	It is the region between troposphere and stratosphere layers.
6. Stratopause :	It is the region between stratosphere and mesosphere layers.
7. Mesopause :	It is the region between mesosphere and thermosphere layers.
8. Ionosphere layer :	It is a layer that contains charged ions and it has an important role in wireless communications.
9. Van-Allen belts :	They are two magnetic belts surrounding ionosphere and play an important role in scattering of harmful charged cosmic radiations.
10. Aurora phenomenon :	It is a phenomenon that appears as brightly coloured light curtains seen at the both poles (The North and South Poles) of the Earth.
11. Exosphere :	It is a region in which the atmospheric envelope is inserted in outer space.
12. Ozone hole :	It means thinning or losing parts of ozone layer above the South pole.
13. Ozone molecule :	<ul style="list-style-type: none"> - It is a molecule formed by combining the atom of an element (which is oxygen) with a molecule of the same element. - It is a gas, whose molecule consists of three oxygen atoms.
14. Dobson :	It is the measuring unit of the degree of ozone layer.
15. Near ultraviolet rays (UVA) :	It is a type of ultraviolet rays that penetrate ozone layer by a ratio 100%.
16. Medium ultraviolet rays (UVB) :	It is a type of ultraviolet rays that is absorbed by a ratio 95% by ozone layer.
17. Far ultraviolet rays (UVC) :	It is a type of ultraviolet rays that is absorbed completely (100%) by the ozone layer.

18. Global Warming phenomenon :	It is the continuous increase in the average temperature of the Earth's near-surface air.
19. Greenhouse effect :	It is the trapping of infrared radiation in the troposphere layer due to the increase of the ratio of greenhouse gases which causes the increase of planet Earth temperature.

2

Important shortcuts

1. UV	Ultraviolet rays.
2. STP	Standard temperature and pressure.
3. CFC _s	Chlorofluorocarbon compounds.
4. IPCC	The intergovernmental Panel on Climate Change.

3

Important laws and solved problems

1 The temperature changes which occur in troposphere layer.

- The temperature decreases with a rate (6.5°C) for each (1 km) height above sea level.
- The amount of change (decrease or increase) in temperature = height (km) \times 6.5
- The temperature at the base of a mountain
= the temperature at its top + the increase in temperature.
- The temperature at the top of a mountain
= the temperature at its base – the decrease in temperature.

Problems :

Problem 1 Calculate the temperature at the base of a mountain, if its height is 6000 m. and the temperature at its top is 10°C .

Solution

- Height = $\frac{6000}{1000} = 6 \text{ km}$.

- The increase in temperature = height $\times 6.5^{\circ}\text{C}$
= $6 \times 6.5 = 39^{\circ}\text{C}$

- The temperature at the base of a mountain
= the temperature at its top + the increase in temperature
= $10 + 39 = 49^{\circ}\text{C}$

Problem 2 Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (-6°C) .

Solution

- The temp. at the top of a mountain = the temp. at its base - the decrease in temp.

$$-6 = 30 - \text{the decrease in temp.}$$

$$\text{The decrease in temp.} = 30 + 6 = 36^{\circ}\text{C} \quad \therefore 36 = \text{Height (km)} \times 6.5$$

$$\text{height} = \frac{36}{6.5} = 5.5 \text{ km.}$$

2 The ratio of erosion of ozone layer in a certain area

\therefore The degree of erosion of ozone layer in a certain area = the normal degree of ozone layer - the degree of ozone in this area.

\therefore The ratio of erosion of ozone layer in a certian area

$$= \frac{\text{Degree of erosion of ozone layer}}{\text{Normal degree of ozone layer}} \times 100 \%$$

Problem Calculate ratio of erosion of ozone layer in an area if you know that the degree of its ozone is 150 dobson.

Solution

The degree of erosion of ozone layer in an area = $300 - 150 = 150$ dobson

$$\text{The ratio of erosion of ozone layer in this area} = \frac{150}{300} \times 100 = 50\%$$

4

Important numbers and ratios

1. The height of atmospheric envelope :	1000 km.
2. The normal atmospheric pressure :	1013.25 mb.
3. The percentage of the mass of atmospheric air that is present in the area between sea level and 3 km height :	50%
4. The percentage of the mass of atmospheric air that is present up to 16 km height above sea level :	90%
5. The thickness of troposphere layer :	13 km.

6. The percentage of the mass of atmospheric air in troposphere :	75%
7. The percentage of atmospheric water vapour in troposphere :	99%
8. The atmospheric pressure at the end of troposphere (tropopause) :	100 mb
9. The temperature at the end of troposphere (tropopause) :	- 60°C
10. The thickness of stratosphere layer :	37 km.
11. The atmospheric pressure at the end of stratosphere (stratopause)	1 mb
12. The temperature at the end of stratosphere (stratopause) :	0°C
13. The thickness of mesosphere :	35 km.
14. The atmospheric pressure at the end of mesosphere (mesopause) :	0.01 mb
15. The temperature at the end of mesosphere (mesopause) :	- 90°C
16. The thickness of thermosphere :	590 km.
17. The temperature at the end of thermosphere :	1200°C
18. The thickness of ozone layer :	20 km.
19. The height in which the presence of charged ions ends in ionosphere :	700 km.
20. Number of oxygen atoms in ozone molecule :	3
21. The thickness of ozone layer under (STP) conditions :	3 mm.
22. Natural degree of ozone layer :	300 Dobson unit
23. The wavelength of near ultraviolet rays (UVA) :	315 – 400 nm.
24. The wavelength of medium ultraviolet rays (UVB) :	280 – 315 nm.
25. The wavelength of far ultraviolet rays (UVC) :	100 – 280 nm.
26. The ratio of near UV radiations that penetrate ozone layer :	100%
27. The ratio of medium UV radiations that don't penetrate ozone layer (Or the ratio of medium UV radiations that are absorbed by ozone layer) :	95%
28. The ratio of far UV radiations that don't penetrate ozone layer (Or the ratio of far UV radiations that are absorbed by ozone layer) :	100%
29. Nanometer :	1×10^{-9} m.

5

Importance or uses

Item	Importance or uses
1. Barometer :	It is used to measure the atmospheric pressure.
2. Altimeter :	It is used by pilots in aeroplanes to measure the elevation from sea level based on atmospheric pressure.
3. Aneroid :	It is used to determine the possible day weather based on atmospheric pressure.
4. Atmospheric pressure maps :	They are used to determine the different atmospheric pressure areas and consequently the direction of wind movement.
5. Isobar lines :	They are used to determine the equal atmospheric pressure areas.
6. Troposphere :	- In which, all atmospheric phenomena take place. - It organizes the Earth's temperature.
7. Ozone layer :	It acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations.
8. Mesosphere :	It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope by formation of meteors.
9. Ionosphere :	It is important in wireless communications and broadcasting.
10. Van-Allen belts :	They play an important role in scattering harmful charged cosmic radiations away from the Earth.
11. Exosphere :	In which, satellites orbit around the Earth.
12. Satellites :	They transmit weather conditions information and TV programs.
13. Chlorofluorocarbon (CFC ₃) compounds (Freons) :	They are used as : • A cooling substance in air conditioning sets. • A propellant substance in aerosols. • A flating substance in making foam backing. • A solvent substance for cleaning electric circuits slides.
14. Methyl bromide gas :	It is used as an insecticide to preserve stored agricultural crops
15. Halons :	They are used in extinguishing fires.

What is the role of...?

1. Ultraviolet radiation in the formation of ozone layer :	Oxygen gas molecule absorbs ultraviolet radiation (UV) which causes the break down of its double covalent bond giving two free oxygen atoms. $\text{O}_2 \xrightarrow{\text{UV}} \text{O} + \text{O}$
2. CO ₂ in global warming :	Increase of CO ₂ in air causes the increase in the temperature of Earth planet.
3. Infrared radiation in global warming :	Infrared radiation has thermal effect, so when trapped in the troposphere layer that leads to increasing the Earth planet temperature.

Give reasons for...

1. The atmospheric pressure decreases by increasing the altitude above sea level.

Due to decreasing the length of air column.

2. Altimeter instrument is important for navigation.

Because it is used by pilots in aeroplanes to determine their elevations from sea level based on the atmospheric pressure.

3. Winds blowing.

Because wind moves from regions of high atmospheric pressure to that of low atmospheric pressure.

4. Wind moves from an area to another on the surface of the Earth.

Due to the difference in atmospheric pressure from an area to another where, there are areas of high atmospheric pressure and another areas of low atmospheric pressure.

5. The troposphere layer is called by this name.

Because all atmospheric turbulences take place in it.

6. The temperature at the top of a mountain is less than that at its foot.

Because in troposphere layer, the temperature decreases with a rate (6.5°C) for each 1km height.

7. All weather conditions take place in troposphere layer.

Because it contains about 75% of the mass of atmospheric envelope.

8. Troposphere layer regulates the Earth's temperature.

Because it contains 99% of atmospheric water vapour.

9. The air motion in troposphere layer is vertical.

Because hot air currents (less density) move upwards, while cold air currents (high density) move downwards.

10. Hot air currents move upwards, while cold air currents move downwards.

Because the density of hot air is less than the density of cold air.

11. The stratosphere layer is called by ozonic atmospheric envelope.

Due to the presence of ozone layer in it.

12. The temperature is high in the upper part of stratosphere layer.

This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer, which is present at its upper part.

13. Stratosphere layer is important for man's life.

Because it contains ozone layer which absorbs harmful ultraviolet radiations emitted from the Sun and also it is convenient for flying of planes.

14. • The lower part of stratosphere is suitable for flying of aeroplanes.

• Pilots prefer to fly their planes in stratosphere.

Because in this part, the air motion is horizontally and neither clouds nor weather disturbances exist.

15. The third layer of atmospheric envelope is named by mesosphere.

Because it is the middle layer.

16. Mesosphere is the coldest layer.

Because the temperature in such layer decreases with a high rate as we go up.

17. Mesosphere layer is highly rarefied.

Because it contains limited quantities of helium and hydrogen gases only.

18. Luminous meteors are formed in mesosphere layer.

Due to burning of celestial rocky masses in this layer as a result of their friction with air molecules.

19. The last layer of atmospheric envelope is called thermal layer.

Because it is the hottest layer in atmospheric envelope.

20. The upper part of thermosphere layer is called ionosphere.

Because it contains charged ions.

21. Ionosphere is important for radio stations.

Because it reflects radio waves transmitted by radio stations and communication centres.

22. The harmful charged cosmic radiations are scattered away from the Earth before entering ionosphere layer.

Due to the presence of Van-Allen belts.

23. Occurrence of aurora phenomenon.

Due to scattering of harmful charged cosmic radiations away from the Earth.

24. Formation of ozone layer in the stratosphere layer.

Because it is the first layer of atmospheric envelope which contains suitable amount of oxygen gas faces ultraviolet radiations emitted from the Sun.

25. Ozone layer is important.

Because it acts as a protective shield for living organisms against the harmful chemical effect of ultraviolet radiation.

26. Ozone layer acts as a protective shield for living organisms.

Because it absorbs harmful ultraviolet radiation emitted from the Sun.

27. The continuity of ozone layer erosion.

Due to increasing the pollutants.

28. Increasing the size of ozone hole in September every year.

Because all pollutants assemble as black clouds that are pushed by wind towards south pole making erosion of ozone layer increases from year to year.

29. Chlorofluorocarbon compounds are dangerous to the environment.

Because they cause erosion of ozone so, harmful ultraviolet radiations penetrate the Earth.

30. Factories should stop their production of foam boxes.

To reduce the use of chlorofluorocarbon compounds as they are used in making foam backing.

31. Scientists ban using freon as a cooling material.

Because freon causes erosion of ozone layer.

32. Stop manufacturing of concorde aeroplanes.

Because their exhausts contain nitrogen oxides that affect the ozone layer.

33. Increasing the average temperature of the Earth's near-surface air during the last years.

Due to increasing of greenhouse gases in the atmosphere.

34. Increasing of CO_2 gas ratio in the atmosphere.

Due to fossil fuel burning, cutting trees and forests fires.

35. Infrared radiation cannot penetrate the Earth's atmosphere.

Because it has long wavelength.

36. The trading or producing CFC_s compounds is prohibited.

To protect ozone layer.

37. Naming global warming phenomenon by greenhouse effect.

Because the Earth's atmosphere resembles the role of glass in greenhouse as it prevents penetration of infrared radiation causing increasing of Earth's temperature.

38. Global warming phenomenon seriously affects the life on poles.

Because it causes melting of ice and snow of both South and North Poles which would increase sea level in seas and oceans.

39. Most countries are attempting to reduce the use of fossil fuel.

To prevent increasing the ratio of greenhouse gases which increase the temperature of Earth planet.

18

What happens when?

1. Diving into depths of the sea [concerning the pressure].

The pressure under water increases by increasing the depth from sea level.

2. Ascending upwards in troposphere (concerning the temperature and the atmospheric pressure).

The temperature decreases with a rate 6.5°C for each 1 km. and the atmospheric pressure decreases.

3. Descending downwards in stratosphere [concerning the temperature and atmospheric pressure].

The atmospheric pressure increases and temperature decreases.

4. There is no ionosphere layer at the end of thermosphere layer.

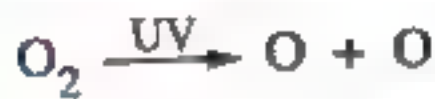
Radio waves transmission does not occur as this layer reflects radio waves transmitted by communications centres.

5. Celestial bodies move with a very high velocity in mesosphere layer.

Luminous meteors are formed as a result of their friction with air molecules.

6. Ultraviolet radiation hits oxygen molecule.

The bond between its molecule is broken down giving two free oxygen atoms (2O)



7. Oxygen atom combines with oxygen molecule.

Ozone molecule is formed.



8. Existence of ozone in conditions of standard temperature and pressure (STP).

The thickness of ozone layer is 3 mm only.

9. Overuse of methyl bromide as an insecticide.

Erosion of ozone layer increases.

10. Overuse of freon.

Erosion of ozone layer increases.

11. Increasing the ratio of nitrogen oxides in the atmospheric envelope.

Erosion of ozone layer increases.

12. The ozone layer is broken down over an area.

Medium and far UV rays penetrate ozone layer and cause harmful effects.

13. Increasing the ratio of greenhouse gases in the atmosphere.

Increasing the temperature of Earth planet.

14. Infrared radiations don't reemit back from troposphere layer.

The increase of planet Earth's temperature due to the thermal effect of infrared radiations.

15. The melting rate of polar ice is increased (concerning the coastal regions).

Coastal areas could drown.

16. Earth's temperature increases (concerning the climatic changes).

Tropical hurricanes, destroying floods, drought waves and forests fires take place.

17. The continuous increase in consumption of fossil fuel.

The ratio of CO₂ gas increases in the atmospheric air by a continuous way which leads to an increase in the planet Earth temperature.

9

Comparisons

1 Layers of atmospheric envelope :

Points of comparison	Troposphere layer	Stratosphere layer	Mesosphere layer	Thermosphere layer
• Thickness :	13 km.	37 km.	35 km.	590 km.
• Temperature :	- 60°C at its end.	0°C at its end.	- 90°C at its end.	1200°C at its end.
• Atmospheric pressure :	100 mb at its top.	1 mb at its top.	0.01 mb at its top.	
• It contains :	- 75% of the mass of the atmospheric air. - 99% of atmospheric water vapour.	Most of ozone gas which is found in atmospheric envelope.	Limited quantities of helium and hydrogen gases only.	Charged ions in its upper part.
• Air movement :	Vertically.	Horizontally.		

2 Ionosphere layer and ozone layer :

Points of comparison	Ionosphere layer	Ozone layer
• Importance :	It reflects radio waves transmitted by radio stations.	It reflects ultraviolet rays emitted from the Sun.
• Place :	In the upper part of thermosphere layer.	In the lower part of stratosphere layer.

3 Near ultraviolet rays and far ultraviolet rays :

Points of comparison	Near ultraviolet rays	Far ultraviolet rays
• The ratio of its penetration into the Earth's surface :	100 %	0 %
• Wavelength :	315 – 400 nm.	100 – 280 nm.
• Their effects on living organisms :	Useful	Harmful

4 Greenhouse effect and ozone hole :

Points of comparison	Greenhouse effect	Ozone hole
• Causes :	Increasing the ratio of greenhouse gases in the atmosphere.	<ul style="list-style-type: none"> • CFC_s compounds. • Methyl bromide gas. • Halons. • Nitrogen oxides.
• Harms :	Increasing the Earth's temperature causing global warming.	Penetration of harmful ultraviolet rays to Earth's surface which threaten the life of living organisms.

10

Activity



ACTIVITY

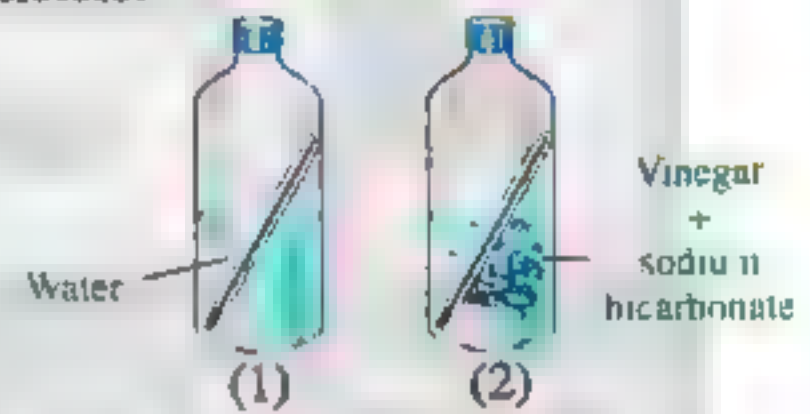
To know the global warming phenomenon.



Tools :

- 2 empty soda bottles.
- Sodium bicarbonate powder.
- Vinegar.
- 2 thermometers.
- Water.

Notice : CO₂ gas is produced from the reaction between sodium bicarbonate and vinegar.



Steps :

1. Pour some water in bottle (1) and the same amount of vinegar in bottle (2).
2. Insert a thermometer in each bottle.
3. Close bottle (1) and put some sodium bicarbonate powder in bottle (2) and close it immediately to keep CO₂ gas trapped.
4. Put both bottles in sunny place.



Observation :

Higher reading of the thermometer in bottle (2).



Conclusion :

The increase in the concentration of CO₂ gas leads to the increase in the temperature.

* Similarly :

- The temperature of planet Earth has been increasing since 1935 due to increasing the greenhouse gases [especially CO₂].

Final Revision

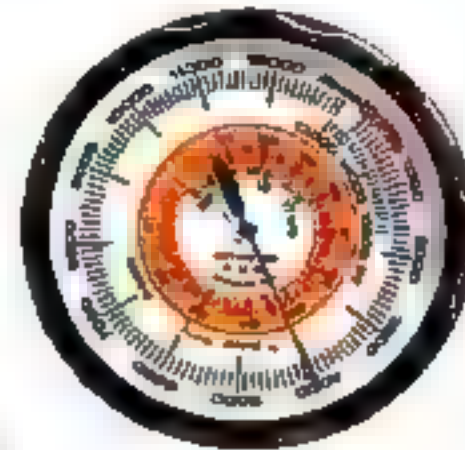
11

Important drawings

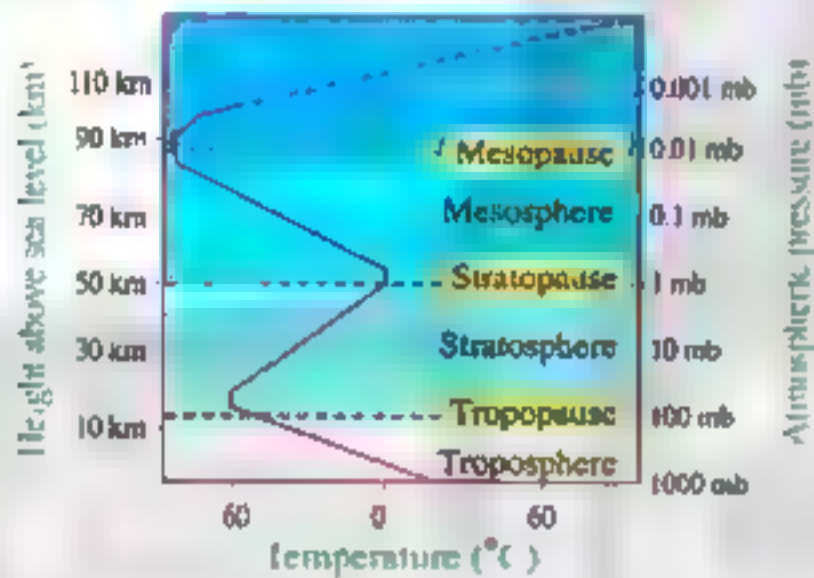
1 Aneroid instrument



2 Altimeter instrument



3 Layers of atmosphere



4 Van-Allen belts

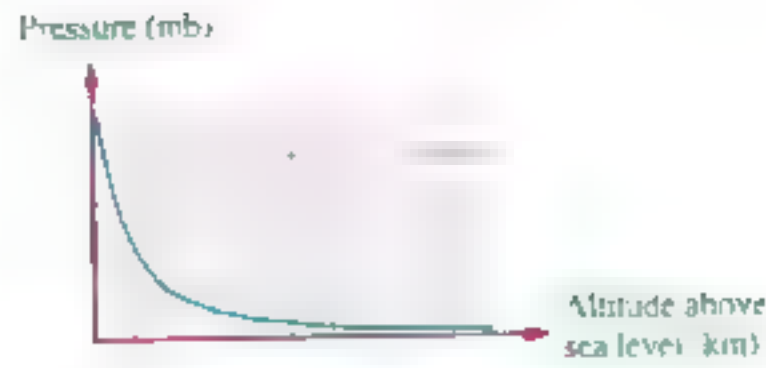


5 The thickness of ozone layer at S.T.P.



The thickness of ozone layer at S.T.P

The atmospheric pressure changes by changing the height above sea level :

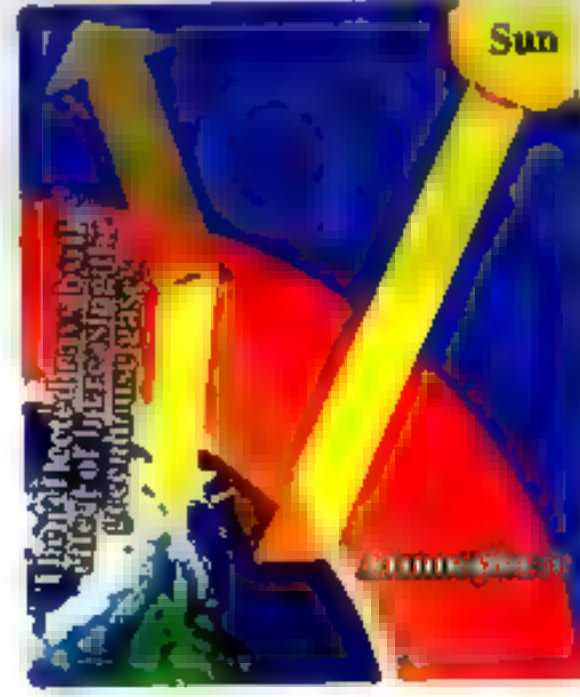
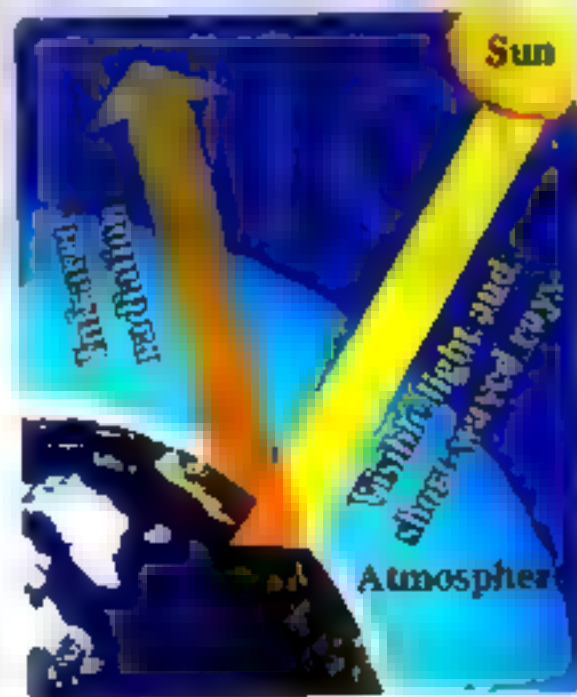


The relation between the altitude above sea level and the pressure

Greenhouse effect :



Global warming phenomenon :



12

Main points

Lesson 1 The Atmospheric Layers :

- 1 The atmospheric pressure is measured in a unit called a **bar** or **millibar**.
1 bar (b) = 1000 millibar (mb).
- 2 The normal atmospheric pressure = 1013.25 mb.
- 3 The atmospheric pressure increases by increasing the length of air column and vice versa.
- 4 The density of air decreases by increasing the elevation above sea level.
- 5 In atmospheric maps :
 - The areas of low atmospheric pressure are represented by "L".
 - The areas of high atmospheric pressure are represented by "H".
- 6 The wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.
- 7 The atmospheric envelope consists of four layers above sea level which are classified according to :
 - The change in atmospheric pressure.
 - The change in temperature.



Lesson 2 Erosion of Ozone Layer and Global Warming :

1. Formation of ozone gas :

1. Oxygen gas molecule (O_2) absorbs ultraviolet radiation (UV), which causes the break down of the bond between the two oxygen atoms giving two free oxygen atoms ($2O$). $O_2 \xrightarrow{UV} O + O$
2. Each oxygen atom combines with an oxygen molecule forming ozone molecule (O_3) which is composed of three oxygen atoms.



2. Pollutants of ozone layer :

1. Chlorofluorocarbon compounds.
3. Halons.

2. Methyl bromide gas.
4. Nitrogen oxides.

3. The most important greenhouse gases :

1. Carbon dioxide gas (CO_2).
2. Chlorofluorocarbon compounds (CFC_s).
4. Nitrous oxide (N_2O).

3. Methane gas (CH_4).
5. Water vapour (H_2O).

4. Interpretation of the greenhouse phenomenon :

When the concentration of greenhouse gases increases in the atmosphere , the atmosphere plays the role of glass in the greenhouse as :

1. It permits the visible light and short-waved rays produced from the Sun to pass.
2. The Earth and its components absorb these rays and reemit the radiation back in the form of infrared radiation.
3. The infrared radiation cannot penetrate the atmosphere, because it has a long wavelength. So , it is kept trapped in the troposphere causing the rise of planet Earth temperature (Greenhouse phenomenon).

5. The negative effects of global warming phenomenon :**(1) Melting of the ice and snow of both South and North Poles :**

Melting of polar ice would increase the level of seas and oceans which threatens :

1. Coastal areas as they could drown.
2. Extinction of some polar animals like polar bear and seals.

(2) Severe climatic changes :

Among these features is the repeated occurrence of :

1. Tropical hurricanes such as hurricane Katrina in 2005.
2. Destructive floods.
3. Drought waves.
4. Forests fires.

Final Revision on Unit

3

Definitions for scientific terms

1. Fossils :	They are traces and remains of old living organisms that are preserved in sedimentary rocks.
2. Trace :	Traces indicate the activity of an old living organism during its life.
3. Remains :	Traces indicate the remains of an old living organism after death.
4. Fossil of a complete body :	It is a type of fossils which was formed as a result of the rapid burying of the organism as soon as it died in a medium preserves it from decomposition and it keeps the whole shape and all the details of the body.
5. Amber :	It is the solidified resinous matter which was secreted by pine trees in old geologic ages.
6. Solid mold fossil :	It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.
7. Cast fossil :	It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.
8. Petrified fossils :	They are fossils in which minerals replace the organic matter for organisms part by part leaving the shape without any change.
9. Petrified woods :	They are fossils which are formed as a result of replacing the organic matter of wood by the silica part by part and they give us details about the life of an old plant.
10. Petrification :	<ul style="list-style-type: none"> • It is the process of changing parts of old living organisms (plants or animals) into rocky materials. • It is the process of replacing the wood material of trees by silica to form petrified woods part by part.
11. Index fossils :	They are fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then become extinct.
12. Fossil record :	The fossils that exist in the rocks of different areas that indicate the extinction and evolution of organisms.
13. Extinction :	<ul style="list-style-type: none"> • It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out. • It is dying out of all members of species of living organisms.
14. Food chain :	It is a path of energy that transmutes from a living organism to another.

20

15. Food web :	A group of food chains connected to each other.
16. Simple ecosystem :	It is an ecosystem that has a few members and it is severely affected by the absence of one of its species.
17. Complicated ecosystem :	It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.
18. Natural protectorates :	They are safe areas established to protect endangered species in their homeland.

2 Importance (or the role of)

Item	Importance (or the role of)
1. Fossils :	<ul style="list-style-type: none"> • Age determination of sedimentary rocks. • Figuring out the paleoenvironment. • Studying life evolution. • Petroleum exploration.
2. Index fossils :	They indicate the age of sedimentary rocks existed in them.
3. Nummulites fossils :	They indicate that El-Mokattam's mountain was a sea floor more than 35 million years ago.
4. Coral fossils :	They indicate that the environment where they lived was clear warm shallow seas.
5. Ferns fossils :	They indicate that the environment where they lived was a hot and rainy tropical environment.
6. Fossil record :	It indicates the extinction and evolution of organisms.
7. Microfossils (foraminifera and radiolaria) :	They indicate that : <ul style="list-style-type: none"> • The age of rocks existed in them. • The suitable conditions for petroleum formation.
8. Natural protectorate :	It protects endangered species in their homeland.
9. Papyrus plant :	Pharaohs used it to manufacture writing papers.
10. Bluestone protectorate :	It protects grey bear from extinction.
11. Ras Mohamed protectorate :	It protects rare species of coral reefs and coloured fish from extinction.
12. Wadi Hetan in wadi El-Raiyan protectorate :	It contains complete whales' fossils 40 million years ago.

3

Important tables

1 Extinct species in the old times :

1 Dinosaur :



Dinosaur became extinct from 66 million years ago.

2 Mammoth :



Mammoth is called the grand father of recent elephant, the first mammoth fossil was discovered in Siberia snow in year 1798.

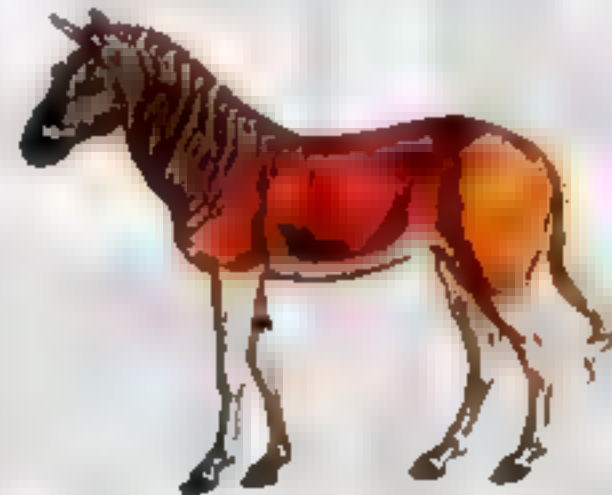
2 Extinct species in the recent times :

1 Dodo bird :



It is a non flying bird due to the reduced size of its wings.

2 Quagga :



- It is a mammal animal.
- It is considered the midway between horse and Zebra.

3 Endangered species :

1 Panda bear :



2 Rhinoceros :



PART

2

1 Ibis bird :



2 Barbary sheep :



3 Papyrus plant :





Used by pharaohs to manufacture writing paper.

4 Bald eagle :

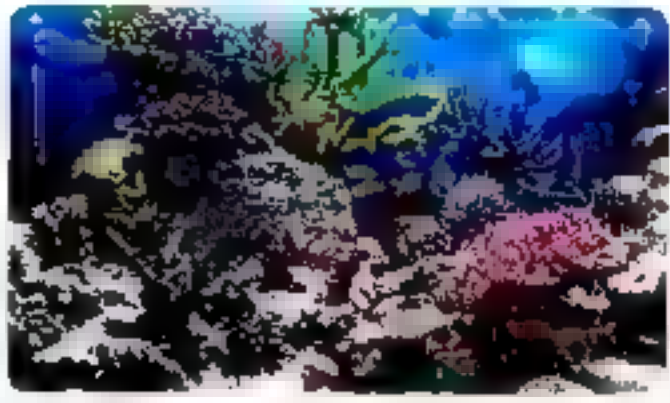
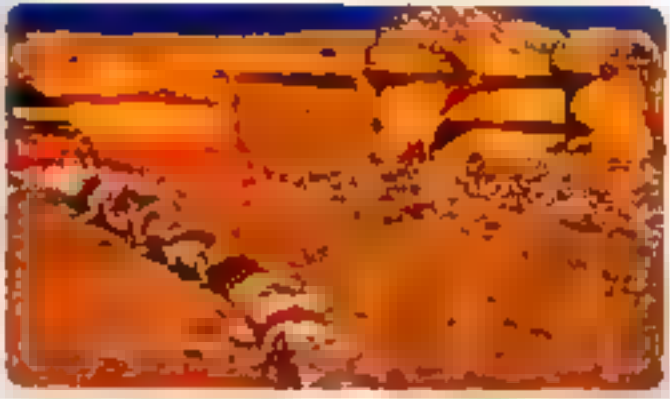


It is called bald because its head is covered with white feathers.

4 The important world's protectorates :

Protectorate	Location	Protected kinds
1. Bluestone protectorate :	USA	<p>Grey bear</p> 
2. Panda protectorate :	Northeastern China.	<p>Panda bear</p> 

5 The important Egypt's protectorates :

Protectorate	Location	Protected kinds
1. Ras Mohamed protectorate : The first established protectorate in Egypt in 1983.	South Sinai governorate.	Rare species of coral reefs and coloured fish 
2. Wadi El-Raiyan protectorate (Wadi Hetan area) :	El-Fayoum governorate.	Complete whales' skeletons fossils (40 million years ago). 

A Give reasons for:

- 1. Mammoth fossil is preserved as a complete body fossil.**
Because when it died, it was rapidly buried in snow, so its body didn't decompose.
- 2. Amber is considered as a suitable medium for formation of complete body fossils.**
Because it is formed of solidified resinous matter which preserves small organisms (like insects) inside it from decomposition.
- 3. Ammonites fossil is classified as a mold fossil.**
Due to formation of a replica of the internal details of a shell of ammonites.
- 4. Formation of petrified woods fossils.**
Due to replacing the organic matter of wood by silica part by part.
- 5. Naming the petrified forest with wood mountain.**
Because it contains petrified wood which looks like rock.
- 6. The petrified woods are considered as fossils although they look like rocks.**
Because they give us the details about the life of an old plant.
- 7. El-Mokattam's mountain was a part of a sea floor more than 35 million years ago.**
Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam's mountain.

8. Nummulites fossils are considered as index fossils.

Because they indicate the age of sedimentary rocks, due to the age of rocks is the same age of fossils existed in them.

9. Not all known fossils are considered as index fossils.

Because the index fossils are the fossils of living organisms that lived a short period of time in the past and wide geographic distribution, then became extinct and these conditions are not available in all fossils.

10. • Importance of fossils in petroleum exploration.**• Foraminifera and radiolaria have an important role in petroleum exploration.**

Because the presence of them in the rocks of the exploratory wells indicate that the suitable conditions for petroleum exploration.

11. Occurrence of old extinctions [macro extinctions].

Due to : - Meteorite impacts with the Earth.

- The violent Earth movement.
- The onset of a long glacial age.
- Emission of poisonous gases from active volcanoes.

12. Occurrence of recent extinction.

- Due to :
- Destroying natural habitat.
 - Overhunting.
 - Environmental pollution.
 - Climatic changes and natural disasters.

13. Dodo bird was an easy target for hunters.

Due to the reduced size of its wings, so it is a non-flying bird.

14. Naming the bald eagle by this name.

Because the head of it is covered with white feathers which makes it look like bald.

15. • The desert ecosystem is significantly affected by the absence of one of its species.**• The simple ecosystem is significantly affected by the absence of one of its species.**

Due to the absence of alternative that compensates the absence of this species.

16. Scientists attempt to establish a gene bank for some types of living organisms.

To protect the rare and endangered living organisms.

17. Some governments are interested in establishing natural protectorate areas.

To protect endangered living organisms in their homeland.

18. Bluestone is an important natural protectorate.

Because it protects grey bear from the danger of extinction.

19. World organizations are intersted in studying the environment of Ras Mohamed protectorate.

Because it contains rare species of coral reefs and coloured fish.

20. Wadi Hetan (a part of Wadi El-Raiyan protectorate in El-Fayoum) is considered the most important area in this protectorate.

Because it contains complete whales' fossils 40 million years ago.

5

What are the consequences of each of the following?

1. An organism is buried fast after death in snow.

A complete body fossil of it is formed.

2. Dipping old insects in amber.

The bodies of insects are preserved inside it from decomposition.

3. The solidification of the mineral sediments inside the ammonites and decomposition of its shell over millions of years.

A solid mold fossil for ammonites is formed.

4. Putting a clam's shell on the surface of a Flat piece of clay and pressing it gently.

A cast of shell is formed carrying the external details of its shell.

5. Silica matter replaces wood material part by part of an old trees.

They change into petrified wood.

6. Using chemical insecticides in a balanced ecosystem.

The food chains break down.

7. Extinction of species from a balanced ecosystem.

It causes a cavity in the path of energy in the ecosystem that would disturb the ecosystem equilibrium or destroy it.

8. The absence of one type of species from the simple ecosystem.

It is severely affected due to the rarity of alternative that compensates this absence.

6

Comparisons

1 Mammoth fossil and amber fossil :

Mammoth fossil	Amber fossil
Burying of mammoth after death immediately in snow which keeps it from decomposition.	Immersing insects in resinous matter (which was secreted by pine trees) which solidifies and preserves the bodies of these insects inside it from decomposition.

2

2 Trace and remains :

Trace	Remains
Traces indicate the activity of an old living organism during its life. <i>Ex. : Traces of worm's tunnels.</i>	Traces indicate the remains of an old living organism after death. <i>Ex. : Remains of dinosaur's skull.</i>

3 Mold and cast :

Mold	Cast
It is the replica of the internal details of the structure of an old living organism. <i>Ex. : Trilobite fossil.</i>	It is the replica of the external details of the structure of an old living organism. <i>Ex. : Fish fossil.</i>

4 Mold and trace :

Mold	Trace
- Traces for the internal details of the structure of an old living organism leaving them in the sedimentary rocks after death. <i>Ex. : Nummulites fossil.</i>	- Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. <i>Ex. : Dinosaur's foot print.</i>

5 Cast and trace :

Cast	Trace
- Traces for the external details of the structure of an old living organism leaving them in sedimentary rocks after death. <i>Ex. : Ferns fossil.</i>	- Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. <i>Ex. : Worms' tunnels.</i>

6 Coral fossils and ferns fossils :

Coral fossils	Ferns fossils
The environment where coral lived was clear warm shallow seas.	The environment where ferns lived was hot and rainy tropical.

7 Nummulites fossil and foraminifera fossil :

Nummulites fossil	Foraminifera fossil
It indicates that the area of El-Mokattam's mountain was a sea floor more than 35 million years ago.	It indicates that : - The age of rocks existed in the exploratory wells. - The conditions are suitable for petroleum formation.

8 Simple and complicated ecosystems :

Simple ecosystem	Complicated ecosystem
<ul style="list-style-type: none"> - It is characterized by containing a few number of members of living organisms. (Few members) - It is severely affected by the absence of one of its species, because of the rarity of alternative that compensates this absence. Ex. : Desert. 	<ul style="list-style-type: none"> - It is characterized by containing a large number of members of living organisms. (Multiple members) - It is not affected much by the absence of one of its species, because it has many alternatives. Ex. : Tropical forest.

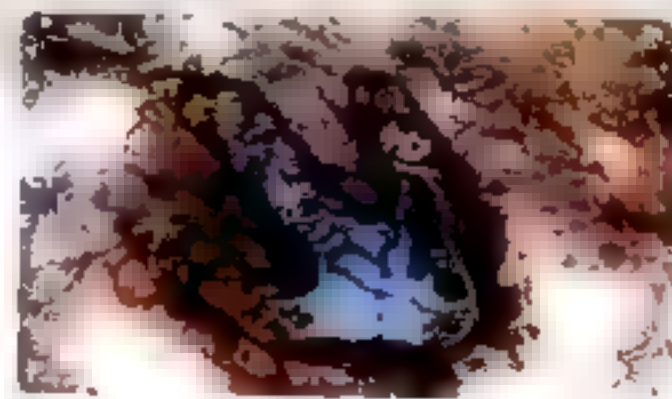
7 Important figures

Examples of traces :

Worm's tunnels



Dinosaur's foot print



Examples of remains :

Remains of a dinosaur's skull



Remains of shark's teeth



PART

2

Examples of solid mold fossils :

Ammonites fossil



Nummulites fossil



Trilobite fossil



Examples of complete body fossils :

Amber fossil



Mammoth fossil



Examples of cast fossils :

Fish fossil



Ferns fossil



Examples of petrified fossils :

Dinosaur's tooth



Dinosaur's eggs





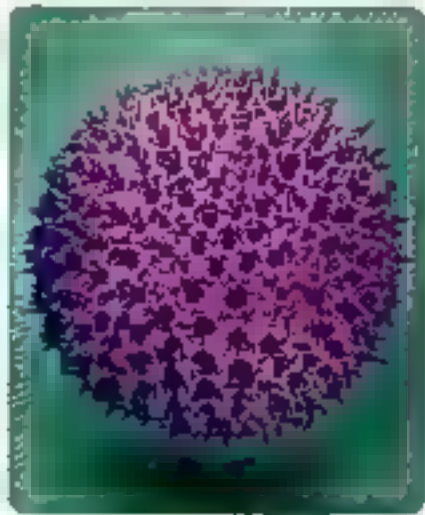
Petrified wood



1111

ذاكر رولى

هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

Intermediate fossil :	Microfossils	
Archaeopteryx fossil 	Radiolaria 	Foraminifera 

8

Main points

Lesson 1 Fossils :

1. How the ammonites solid mold fossil is formed ?

- When a snail (or clam) dies, it falls on the sea floor, where its soft parts decomposed leaving the shell which is buried in sediments.
- The sediments fill up the shell cavities and solidify as the time passes.
- The shell decomposes completely, leaving a solid rock mold carrying the internal details of the snail.

2. Suitable conditions for fossils formation (or preservation) :

1. Presence of hard skeleton of organism.
2. The organism body must be buried immediately after death in a medium that preserves it from decomposition.
3. The existence of a suitable medium in which the mineral material replaces the organic material of the living organism.

3. Studying the fossil record showed that :

1. Life started first in sea, then established on land.
2. Organisms developed from simple to complicated as :
 - Algae appeared before mosses and ferns.
 - Gymnosperms appeared before angiosperms.
 - Invertebrates (such as corals and mollusks with shells) appeared before vertebrates.
 - Fish were the first vertebrates that appeared, followed by amphibians, then reptiles, and finally birds and mammals appeared together.

4. Archaeopteryx fossil is considered a link between reptiles and birds.

Lesson 2 Extinction :

1. Reasons of extinction :

A. Reasons of extinction in old ages [macro extinctions] :

Many Scientists attributed macro extinctions, which many living organisms lived on Earth exposed to like extinction of dinosaurs is due to occurrence of :

1. Meteorite impacts with Earth.
2. The violent Earth movement.
3. The onset of a long glacial age.
4. Emission of poisonous gases from active volcanoes.

B. Reasons of extinction in recent ages :

Recent extinction that is occurred now is caused by different factors. Most of them are due to the interference of man with nature such as :

1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

2. Examples of some extinct species in old times :

- Dinosaur.
- Mammoth.

3. Examples of some extinct species in the recent times :

- Dodo bird [It is a non-flying bird].
- Quagga [It is considered the midway between horse and zebra].

4. Examples of endangered species :

- Panda bear.
- Rhinoceros.
- Bald eagle.
- Ibis bird.
- Papyrus plant.
- Barbary sheep.

5. Ways to protect rare and endangered living organisms :

1. Rearing and reproducing the endangered species and sending them back to their native habitats.
2. Establishing gene banks for the much endangered species.
3. Establishing natural protectorate areas.
4. Issuing legislations and rules to organize and control hunting in land, sea , and air especially for the rare types.
5. Increasing the awareness about the importance of natural life to sustain the existence of mankind.

UNIT ONE

Lesson

1

Attempts of Elements Classification

Worksheet

1

Question

1

A Choose the correct answer :

- Mendeleev arranged the elements of similar properties in .
 - vertical periods.
 - horizontal groups.
 - vertical groups.
 - horizontal periods.
- Moseley classified elements in his table in an ascending order according to their
 - atomic weights.
 - atomic numbers.
 - chemical activity.
 - valencies.
- The number of elements in Mendeleev's periodic table is elements
 - 67
 - 76
 - 92
 - 116
- left gaps in his table to be filled with suitable discovered elements in future.
 - Moseley
 - Rutherford
 - Bohr
 - Mendeleev
- The scientist who added zero group is
 - Mendeleev.
 - Rutherford.
 - Moseley.
 - Bohr.
- The scientist had discovered the main energy levels.
 - Moseley
 - Bohr
 - Hofmann
 - Mendeleev

B Write the scientific term :

- Arrangement of the elements in an ascending order according to their atomic weights. (.....)
- Arrangement of the elements in an ascending order according to their atomic numbers. (.....)
- They are symbolized by K , L , M , N , O , P and Q letters. (.....)

Question

2

A Complete the following statements :

- Mendeleev discovered that the properties of elements were repeated ...
by the beginning of each new

Worksheets

2. The atomic number of each element in Moseley's periodic table increases by from the preceding element in the same
3. and scientists modified the Mendeleev's table.
4. In Mendeleev's table, the elements are arranged in according to their atomic weights.
5. Mendeleev arranged the elements ascendingly according to , while Moseley arranged them ascendingly according to
6. Mendeleev explained his periodic table in his book .

Q What are the disadvantages of Mendeleev's table ? (Mention two only).

Question

3

A To who are these achievements attributed :

1. Corrected the atomic weights of some elements which were estimated wrongly. (.)
2. Added zero group to the periodic table. (.)
3. Discovered that the nucleus of the atom contains positively charged protons. (.)

B Put (✓) or (x), then correct what is wrong :

1. The elements which have similar chemical and physical properties are put in horizontal periods.
()
2. Scientists classified the elements in order to facilitate their study.
()
3. Mendeleev had to put more than one element in one place.
()
4. Rutherford had discovered the main energy levels of the atom.
()

Question

4

A Give a reason for :

Scientists thought to classify elements according to their properties.

.....
.....

1

B Correct the underlined words :

- The elements are arranged in Mendeleev's table in an ascending order according to the increase in the atomic number. (.....)
- Moseley put lanthanides and actinides on the left side of the periodic table. (.....)

Worksheet

2

Question

1

A Complete the following statements :

- The number of elements which exist in nature is
 - Elements of "s" block are located on the of the periodic table and they arranged in groups.
 - The period number of the element equals the number of occupied by electrons in its atom.
 - The transition elements start from period in the modern periodic table.
 - The modern periodic table consists of horizontal periods and vertical groups.
- What is the scientific principle upon which the elements are arranged in the modern periodic table ?
-
-

Question

2

A Write the scientific term :

- A block of elements which is located on the right side of the periodic table.
• The block which contains the groups from (3A) to (7A). (.....)
- A kind of elements is symbolized by letter (B). (.....)
- They are symbolized by s , p , d and f. (.....)
- The block which contains the lanthanides and actinides. (.....)
- The elements which occupy the middle block (d) in the periodic table. (.....)

B Locate the position of the following elements in the mo



.....

.....



B Mention

C Correct the underlined words :

- The elements in Moseley's periodic table are arranged according to the way of filling the energy sublevels with electrons. (.. . . .)
- The scientist Rutherford discovered the main energy levels. (.. . . .)

Question 3

A Choose the correct answer :

- Elements of "p" block are arranged in groups.
 - two
 - five
 - six
 - eight
- Which of the following elements locates in the third period ?
 - ${}_{19}\text{K}$
 - ${}_{15}\text{P}$
 - ${}_6\text{C}$
 - ${}_3\text{Li}$
- All of the following elements are located in group (2A) except
 - ${}_4\text{Be}$
 - ${}_{20}\text{Ca}$
 - ${}_{11}\text{Na}$
 - ${}_{12}\text{Mg}$
- The element that its atomic number equals 17 is similar in its chemical properties to the element that its atomic number equals
 - 2
 - 7
 - 9
 - 19
- The elements which have the same properties locate in the same in the periodic table.
 - period
 - group
 - nucleus
 - energy level
- The block that contains groups (1A) and (2A) in the periodic table is block.
 - s
 - p
 - d
 - f
- Which of the following elements locates in the same group in the periodic table ?
 - ${}_{11}\text{Na}, {}_6\text{C}$
 - ${}_{11}\text{Na}, {}_3\text{Li}$
 - ${}_{11}\text{Na}, {}_{29}\text{Cu}$
 - ${}_{11}\text{Na}, {}_{10}\text{Ne}$
- An element, its atomic number is (18) , so it is considered as
 - a transition element.
 - an inert gas.
 - a metallic element.
 - a halogen.

One difference between : Fluorine molecule and helium molecule :

Fluorine molecule	Helium molecule
.....
.....

Question

4

A Find the atomic number of each of the following :

1. An element exists in period 2 and group (6A).

.....

2. An element exists in period 3 and group (1A).

.....

3. An element exists in period 2 and zero group.

.....

B Put (✓) or (x), then correct what is wrong :

1. The modern periodic table consists of three blocks of elements.

()

2. The period number of the element equals the number of electrons in the outermost energy level in its atom.

()

3. The atomic number of an element increases from an element to the next element in the period by one.

()

C Give a reason for :

Elements of the same group have similar properties.

.....

UNIT ONE

Lesson

2

Graduation of Properties of Elements in the Modern Periodic Table

Worksheet

3

Question

1

Complete the following statements :

1. is the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.
2. is a polar compound because the difference in ... between its elements is relatively ...
3. In ammonia molecule, atom attracts the electrons of the bond more than ... atom as it has higher ...
4. From examples of polar compounds are and

Question

2

A Give reasons for :

1. The atomic size of sodium ($_{11}\text{Na}$) is greater than that of magnesium ($_{12}\text{Mg}$).

.....

.....

2. In groups, by increasing the atomic number, the atomic size increases.

.....

.....

3. Ammonia (NH_3) is considered as a polar covalent compound.

.....

4. Water is more polar than ammonia.

.....

B What happens if ... ?

There is no difference in electronegativity between hydrogen atom and oxygen atom in water molecule.

.....

PART

1

Question 3

Compare between :

1. The atomic size and the electronegativity (concerning the definition) :

The atomic size	The electronegativity
.....
.....
.....
.....

2. The group and the period. (concerning the graduation of atomic size property) :

The group	The period
.....
.....
.....
.....

Question 4

A Write the scientific term :

1. The measuring unit of atomic radius. (.....
2. They are covalent compounds in which the difference in electronegativity between elements forming their molecules is relatively high. (.....

B Put (✓) or (x), then correct what is wrong :

1. In periods, by increasing the atomic number, the atomic size decreases.
()
2. Ammonia is more polar than water.
()

Worksheet

4

Question 1

A Write the scientific term :

- 1 Elements which have less than 4 electrons in their outermost energy level. (.....

Worksheets

- An atom of nonmetallic element that gains one electron or more during the chemical reactions. (.....)
- The strongest nonmetal in group (7A). (.....)

B Correct the underlined words :

- The number of electrons in positive ion is greater than that of its atom. (.....)
- Each period ends by a nonmetal element. (.....)
- The metallic property decreases in group (1A) as we go from the top to the bottom. (.....)
- The strongest nonmetal element locates in the first group. (.....)

Question 2**Complete the following statements :**

- During chemical reactions, atoms of metals tend to electron(s) and change into which carry a number of positive charges equal to the number of lost
- Silicon ($_{14}\text{Si}$) is a element which has the properties of and
- By increasing the atomic number within a period, the metallic property, while the nonmetallic property
- The most metallic element in group (1A) locates at the, while the least metallic element lies at the of the group.
- Each period in the modern periodic table starts with elements.

Question 3**A Choose the correct answer :**

- All of the following ions have the same electronic configuration of neon ($_{10}\text{Ne}$) except
 a. Al^{+3} b. Na^{+} c. Li^{+} d. Mg^{+2}
- An element (X), its atomic number is 15 so, the number of electrons in its ion equals
 a. 10 b. 15 c. 17 d. 18
- By increasing the atomic number within a period, the
 a. metallic property increases. b. metallic property decreases.
 c. nonmetallic property decreases. d. atomic size increases.

PART

1

4. An element (Y), its atomic number is 13 so, the electronic configuration of its ion is

- a. 2, 8 b. 2, 8, 3 c. 2, 8, 8 d. 2, 8, 8, 3

5. All of the following elements are from semi-metals except

- a. tellurium. b. silicon. c. boron. d. bromine.

B Give reasons for :

- Cesium is considered one of the strongest metallic elements.

Question

4

A What is meant by ... ?

1. Nonmetals :
2. Positive ion :
3. Metalloids :

B Look at the following figures, then answer the following questions :

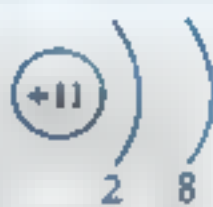


Fig. (A)

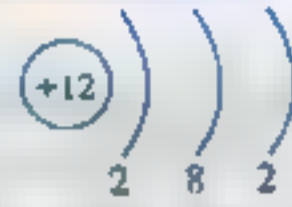


Fig. (B)

1. Which of the previous figures represents.

- a. A positive ion :
- b. A neutral atom :

2. Determine the position of the atom in the periodic table (period - group) :

Worksheet

5

Question

1

A Show by a symbolic balanced equations each of the following :

1. Adding dilute HCl to pieces of magnesium.

Worksheets

2. Burning a magnesium strip in air, then adding some water.

.....

.....

3. Burning a piece of coal in air.

.....

.....

B Correct the underlined words :

- Nonmetal oxides are considered as basic oxides.

(.....)

Question 2

A What is meant by ...?

1. Chemical activity series :

.....

2. Acidic oxides :

.....

B Choose the correct answer :

1. All of the following elements don't react with dilute HCl except

- a. Cu b. Zn c. S d. C

2. All of the following are related to CO_2 except

- a. it is acidic oxide. b. it is nonmetal oxide.
c. its solution turns litmus to red. d. its solution turns litmus to blue.

3. Metal oxides are oxides.

- a. acidic b. basic c. neutral d. amphoteric

4. Sodium oxide is from oxides.

- a. amphoteric b. acidic c. nonmetallic d. basic

Question 3

A Complete the following statements :

1. Some metal oxides dissolve in water giving which turns litmus solution into

2. Sodium reacts with water and gas evolves which with a sound.

3. ... and are metals which don't react with water.

PART

1

4. When magnesium oxide dissolves in water, it gives , while carbon dioxide dissolves in water giving

5. Basic oxides are formed by the reaction of with oxygen, while acidic oxides are formed by the reaction of with oxygen.

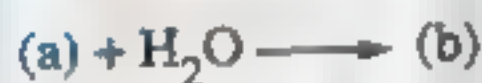
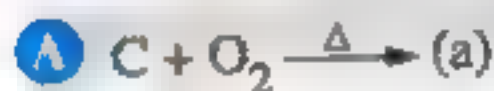


B Compare between basic oxides and acidic oxides (two points only) :

Basic oxides	Acidic oxides
.....
.....
.....

Question

4



1. Write the name and the chemical formula of each (a) and (b).

2. What is the effect of (b) on litmus solution ?

B What happens when ... ?

1. Putting a magnesium strip inside a jar filled with oxygen gas.

2. Adding drops of violet litmus solution to a cylinder containing a piece of burning coal.

3. Dissolving magnesium oxide in water.

Worksheet

6

on Lessons 1 & 2 Unit ONE

Question

1

A Choose the correct answer :

- Mendeleev arranged elements of similar properties in vertical columns called later as .
a. groups. b. periods. c. rows. d. no correct answer.
- explained his periodic table in his book "principles of chemistry".
a. Moseley b. Rutherford c. Bohr d. Mendeleev
- Helium locates in group.
a. 2A b. 3A c. 4A d. zero
- Nucleus is positively charged because it contains
a. electrons. b. protons. c. neutrons. d. (a) and (b).
- react very slowly with cold water.
a. Ca & Mg b. K & Na c. Zn & Fe d. Cu & Ag

B Give reasons for :

- Mendeleev left gaps in his periodic table.
.....
.....

- Sulphur dioxide is considered an acidic oxide.
.....

Question

2

A Complete the following :

- discovered that the nucleus contains positively charged protons.
- The largest atom of elements in size is atom and the smallest one is atom.
- and don't react with water.

PART

1

B Locate the position of the following elements in the modern periodic table :



Question

3

A Put (✓) or (x), then correct what is wrong :

1. The p-block elements are located in the left side of the periodic table.

()

2. The f-block contains lanthanides and actinides.

()

3. Na_2O is an acidic oxide.

()

B What happens when ... ?

1. Carbon reacts with oxygen.

2. Sodium loses one electron during the chemical reaction.

Question

4

A Find the atomic number of each of the following :

1. An element exists in period 4 and group (1A).

2. An element exists in period 2 and group (7A).

3. An element exists in period 3 and group (5A).

B What is meant by amphoteric oxides ?

16

UNIT ONE

Lesson

3

Main Groups in the Modern Periodic Table

Worksheet

7

Question

1

A Write the scientific term :

1. Elements which are located at the left side of the periodic table in group (1A). (.....)

2. The most active metal. (.....)

B Choose the correct answer :

1. Elements which have atomic numbers are called alkali metals.

a. 2, 8, 16

b. 2, 10, 18

c. 3, 11, 19

d. 4, 12, 20

2. Alkali metals have the following properties except ..

a. they have low density.

b. they conduct electricity.

c. they conduct heat.

d. they don't react with water.

3. When sodium reacts with water, gas evolves.

a. O_2

b. CO_2

c. H_2

d. NO_2

4. are kept under the surface of kerosene in the lab.

a. Alkali metals

b. Halogens

c. Inert gases

d. Alkaline earth metals

5. The most active element in group (1A) is

a. Na

b. Cs

c. K

d. Li

Question

2

Give reasons for :

1. Elements of group (1A) are known as alkali metals.

.....

2. Sodium is kept under the surface of kerosene.

.....

.....

PART

1

3. Rubidium and cesium elements sink in water.

4. The reaction of potassium with water is stronger than that of sodium.

Question

3

Complete the following statements :

1. Lithium element water surface as its density is than that of water.
2. During the chemical reactions , sodium tends to an electron and changes into ion which carries positive charge.
3. Potassium reacts with water giving and gas evolves.
4. The chemical activity of alkali metals as the increases.
5. When sodium reacts with water, gas evolves.

Question

4

The opposite figure represents group (1A) of the periodic table.

Answer the following questions :

1. The element which has the electronic configuration (2, 8, 8, 1) is ..
2. The most metallic element is
3. Elements which float on the water surface are
4. The least metallic element is

A
B
C
D
E

Worksheet 8

Question

1

A Complete the following :

1. Halogens locate in group ..
2. and are halogens which exist in gaseous state.
3. is used in food preservation.
4. Silicon is used in manufacture of , while liquefied nitrogen is used in ..

B Write the scientific term :

1. The halogen which exists in a liquid state.
2. Rays which are emitted from cobalt (60).

(.....)
(.....)

Worksheets

Question 2

A Which of the following elements $_{11}\text{X}$, $_{17}\text{Y}$, $_{14}\text{Z}$:

1. Can replace iodine in potassium iodide solution :
2. Used in the manufacture of electronic slides :
3. Can react together and form salt :

B Mention one use for each of the following :

1. Silicon slides :
2. Liquid sodium :
3. Cobalt 60 :

Question 3

A Put (✓) or (x), then correct what is wrong :

1. Halogens are monovalent elements.
()
2. Boiling point of liquefied nitrogen is (-196°C) .
()
3. Bromine is a halogen which exists in a solid state.
()

B Give reasons for :

1. Halogens are not exist in nature in elementary state.
.....
2. Halogens are called by this name.
.....
3. Liquefied nitrogen is used in cornea preservation.
.....

Question 4

A Complete the following equations :

1. $\text{Br}_2 + \text{NaCl} \longrightarrow$
2. $\text{Cl}_2 + 2\text{KI} \longrightarrow$ +
3. $2\text{K} + \text{Br}_2 \longrightarrow$

B Choose the odd word out, then mention the scientific term for the rest :

1. Potassium / Iodine / Fluorine / Astatine / Bromine.
.....
2. Fluorine / Chlorine / Oxygen / Hydrogen / Sodium.
.....

PART

1

Worksheet

2

on Lessons 1, 2 and 3 Unit ONE

Question

1

A Complete the following statements :

1. is a radioactive element.
2. Halogens mean
3. and are examples of acidic oxides.
4. Elements of the same are similar in the number of electrons in the outermost energy level.

B Write the scientific term of each of the following :

1. The metalloids which are used in the manufacture of electronic devices. (... ..)
2. The halogen which exists in a solid state. (... ..)

Question

2

A Correct the underlined words :

1. Liquefied nitrogen is used in food preservation. (... ..)
2. Halogens exist in the form of monoatomic molecules. (... ..)
3. Transition elements lie in s-block. (... ..)

B Give reasons for :

1. Elements of group (1A) are known as alkali metals.

.....

.....

2. Iodine can't replace bromine in its salt solution.

.....

.....

Question 3

A Choose the odd word out :

1. SO_2 / MgO / Na_2O / CaO

2. Fluorine / Chlorine / Iodine.

3. Sodium / Magnesium / Aluminium / Sulphur.

B What happens when ... ?

1. Increasing the atomic number in period 1 (Concerning the atomic size).

2. We go from down to up inside group 7A (Concerning chemical activity).

Question 4

A Choose the correct answer :

1. is used in food preservation.

a. Sodium

b. Cobalt 60

c. Silicon

d. Liquefied nitrogen

2. Carbon dioxide reacts with water forming

a. H_2CO_3 b. HCl c. HNO_3 d. H_2SO_4 3. Al_2O_3 is known as

a. acidic oxide.

b. basic oxide.

c. amphoteric oxide.

d. (a) and (b) are correct.

B Silicon is a semi-conductor of electricity. Explain.

UNIT ONE

Lesson

4

Water

Worksheet

10

Question

1

A Choose the correct answer :

- All of the following are from water properties except
 - it exists in three states.
 - it has high boiling point.
 - it is used in generating electricity.
 - it is a non-polar compound.
- Water molecule consists of ..
 - two atoms of three different elements.
 - three atoms of two different elements.
 - three atoms of three different elements.
 - four atoms of two different elements.

B What is the importance of Hofmann's voltameter :

.....

Question

2

A Complete the following statements :

- Water is considered as a good solvent , as it dissolves most compounds.
- The density of water in state is lower than its density in ... state.
- Water molecule consists of atoms and atom.
- The bond between water molecules is called bond.
- Increasing the boiling point of water is due to

B What is meant by hydrogen bond ?

.....

Question

3

A Mention what happens when ... ?

- The temperature of water decreases than 4°C .

.....

B Put (✓) or (✗), then correct what is wrong :

- Table salt and sugar are from covalent compounds.

()

Worksheets

2. The angle between the two covalent bonds in water molecule is 104.5° .

()

3. Hydrogen bond is weaker than covalent bond.

()

Question 4

A Write the scientific term :

1. The bond between hydrogen atom and oxygen atom in water molecule. (.....)
2. The bond which links the molecules of water. (.....)
3. The positive pole of Hofmann's voltameter. (.....)
4. Ions responsible for the basic property in water molecule. (.....)

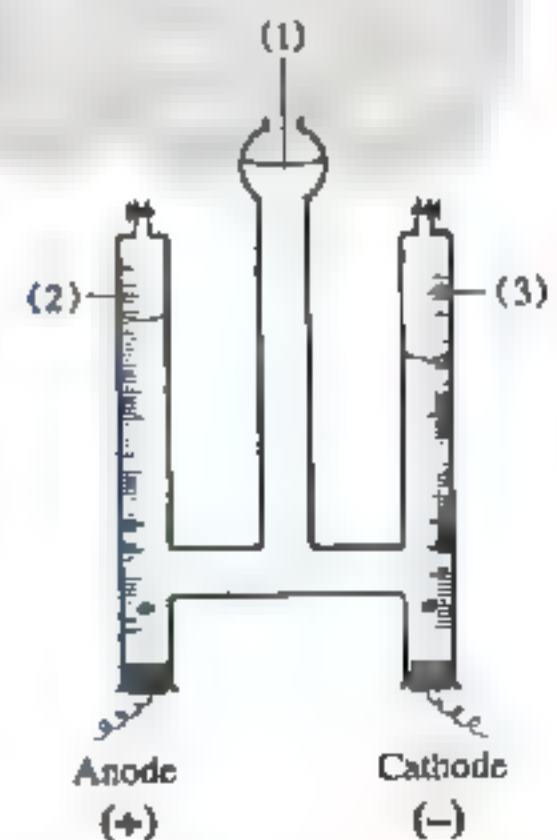
B Give reasons for :

1. Ice floats on water surface.
.....
2. Adding drops of dilute acid to water during its electrolysis.
.....
3. The closed glass bottle filled with water is broken when it is put in freezer.
.....
4. Sugar dissolves in water although it is a non-polar compound.
.....
5. Water has neutral effect on both litmus papers.
.....

Question 5

A From the opposite figure , answer the following questions :

1. What is the name of this apparatus?
.....
2. Label the numbers (1) , (2) and (3).
(1) (2) (3)
3. What happens if a glowing splint is put above the anode and the cathode?
* Above the anode, ..
* Above the cathode, ..
4. Write the balanced equation of this reaction.
.....



5. Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 20 cm^3
.....

PART

1

- B** 1. Calculate the volume of the gas which evolves above the negative pole in Hofmann's voltameter if the volume of the gas which evolves above the positive pole is 30 cm^3 .
-
2. On the electrolysis of a certain volume of acidified water by dilute sulphuric acid, the volume of the gas that evolves above the cathode is 10 cm^3 . What is the volume of the gas that evolves at the anode ?
-

Worksheet 11

Question

1

Explain what happens when :

1. Storing the tap water in empty plastic bottles.
-

2. Water is polluted by the wastes of man and animal.
-

Question

2

Complete the following :

1. Mixing of animals and human wastes with water leading to the infection by many diseases such as and
2. Increasing the mercury concentration in drinking water causes , while arsenic increases the infection rate by
3. We must the drinking water tanks and don't store the tap water in bottles.
4. Eating fishes contain high concentration of lead cause the of brain cells.
5. The nuclear reactors cause both and pollution for water.

Question

3

- A** 1. Nuclear reactors cause thermal pollution and radiant pollution. Explain.
-
-
-

Worksheets

2. How to protect water from pollution ? (Two points only)

.....

.....

B Write the scientific term :

1. A kind of water pollution which results from mixing of humans and animals wastes with water. (.....)
2. A kind of water pollution which results from discharging of factories residues and sewage in rivers and seas. (.....)
3. A water pollutant which causes the death of brain cells. (.....)

Question 4

A What is meant by water pollution ?

.....

.....

B Put (✓) or (x), then correct what is wrong :

1. Eating food containing high percentage of lead causes hepatitis.
()
2. Adding of agricultural fertilizers to water causes water pollution.
()
3. Storing the tap water in plastic bottles causes the increase of infection with hepatitis.
()

General Exercise of the School Book

on Unit ONE

1 Choose :

1. Scientist discovered the main energy levels in the atom.
a. Bohr b. Mendeleev c. Moseley d. Hofmann
2. Sodium oxide is from oxides.
a. amphoteric b. acidic c. nonmetallic d. basic
3. All of the following elements are from semi-metals except
a. tellurium. b. silicon. c. boron. d. bromine.
4. The strongest metal locates in the group.
a. 2A b. 1A c. 1B d. 7A

2 What is meant by ...?

1. Chemical activity series :

.....

2. Water pollution :

.....

3. Semi-metals :

.....

3 How can you differentiate between magnesium oxide and sulphur oxide ?

.....

.....

4 What is the importance of ?

1. Liquefied nitrogen :
2. Sodium :
3. Water :

5 Give reasons for :

1. The use of radioactive cobalt 60 in food preservation.

.....

.....

Worksheets

2. Elements of the same group have similar properties.

.....

.....

3. The boiling point of water is high.

.....

.....

4. Alkali metals are kept under kerosene in the lab.

.....

.....

6 What is the effect of the following on the water environment ?

1. Drainage of factories wastes in rivers and seas :

.....

.....

2. Using of rivers and seas water as a renewable source for cooling the nuclear reactor :

.....

.....

3. Mixing of animal and man wastes with water :

.....

.....

Model Exams

on Unit ONE

Model Exam

1

20

Answer the following questions :

Question 1 5 marks

Choose the correct answer :

- Pure water in the normal atmospheric pressure boils at °C
a. 50 b. 90 c. 100 d. 10
- Polar water molecules are linked together by bonds.
a. hydrogen b. covalent c. ionic d. no correct answer
- has the properties of both metals and nonmetals.
a. Na b. Cl c. B d. Ne
- The number of elements in Mendeleev's periodic table is elements.
a. 92 b. 118 c. 76 d. 67
- metal oxides are oxides.
a. acidic b. basic c. amphoteric d. no correct answer

Question 2 5 marks

A Correct the underlined words :

- Pure water is a good conductor of electricity. (.....)
- The cathode is the positive pole in Hofmann's voltameter. (.....)
- Moseley discovered that the nucleus of the atom contains positively charged protons. (.....)

B Give reasons for :

- Occurrence of radiant pollution.
.....
- Thermal pollution leads to death of marine cultures.
.....

Worksheets

Question 3 5 marks

A Complete the following sentences :

1. is used in the transferring heat from inside the nuclear reactor to outside.
2. Acidic oxides dissolve in water giving
3. Nuclear reactors cause both of pollution and pollution.
4. and are examples of nonmetals.
5. + \longrightarrow H_2CO_3

B Mention an example of a metalloid used in the manufacture of electronic devices.

Question 4 5 marks

A What happens when ... ?

1. Dumping the atomic wastes in oceans and seas.
2. Adding dil. HCl to a piece of copper.

B Explain how we can dissolve the ice of the freezer quickly.

Model Exam

2

20

Answer the following questions :

Question 1 5 marks

Complete the following sentences :

1. is responsible for the abnormal properties of water.
2. Water has effect on litmus paper.
3. and are examples of halogens.

PART

1

4. is the measuring unit of atomic radius.



6. is the positive pole in Hofmann's voltameter, while is the negative pole.

Question

2

5 marks

A Put (✓) or (✗):

- The angle between two single covalent bonds of water is 104.5° ()
- Eating food containing high concentration of arsenic causes blindness. ()
- The boiling point of liquefied nitrogen is (-196°C) . ()

B Give reasons for :

- It is dangerous to eat food containing high concentration of mercury.

- Both nitrogen and lithium are located in the same period.

Question

3

5 marks

A Choose the correct answer :

- The elements of modern periodic table are classified into
 - one block.
 - two blocks.
 - three blocks.
 - four blocks.
- is an atom of nonmetallic element which gains an electron or more during chemical reactions.
 - Positive ion
 - Negative ion
 - Excited atom
 - No correct answer
- is used in nuclear reactors.
 - Silicon
 - Cobalt 60
 - Liquefied nitrogen
 - Liquid sodium

B What happens when ... ?

- Adding few drops of dilute sulphuric acid to water (during its electrolysis).

- We approach a glowing splint to oxygen gas.

Question

4

5 marks

- A Compare between elements of group (1A) and group (7A) concerning (Name - Valency - Kind of formed ions - block)

Points of comparison	Elements of group (1A)	Elements of group (7A)
Name :
Valency :
Kinds of formed ions :
Block :

- B Mention the types of water pollution.

.....

.....

UNIT TWO

Lesson

1

The Atmospheric Layers

Worksheet 12

Question

1

A Choose the correct answer :

- The air in the troposphere layer moves
 a. horizontally. b. vertically. c. inclined. d. no right answer.
- The device which is used in measuring the altitude above sea level is the
 a. altimeter. b. aneroid. c. ammeter. d. (a) and (b).
- The density of air by increasing the elevation above the sea level.
 a. increases b. decreases c. doesn't change d. no correct answer
- layer extends from the sea level to the tropopause.
 a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
- layer extends from stratopause to mesopause.
 a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
- The atmospheric pressure on the top of a mountain is the atmospheric pressure at the sea level.
 a. more than b. less than c. equal to d. half
- is located between stratosphere and mesosphere.
 a. Tropopause b. Stratopause c. Mesopause d. Stratosphere

B Problem :

If the temp. at the foot of Everest mountain is 20.6°C . Find the temp. at its top of height 8862 m. above Earth's surface.

Question

2

Give reasons for :

- Most of weather conditions take place in troposphere layer.
- The troposphere layer regulates the Earth's temperature.

Worksheets

3. The atmospheric pressure in troposphere layer decreases by increasing the height above sea level.

4. The air motion is vertical in the troposphere layer.

Question

3

Complete the following statements :

1. The thickness of troposphere layer is about
2. As we go up 1 km above the sea level, the temperature with
3. Most weather features occur in
4. Troposphere layer contains about of the mass of the atmospheric air and about of atmospheric water vapour.
5. The aneroid is used to
6. The is a device used to measure the height of aeroplanes.

Question

4

A 1. Compare between :

The atmospheric pressure and the atmospheric envelope [in the view of definition].

The atmospheric pressure	The atmospheric envelope
.....
.....
.....

2. Calculate the height of a mountain if temperature at its foot is 19°C and at its top is 6°C .

B Arrange :

1. The layers of atmospheric envelope [according to the change in atmospheric pressure].
2. The atmospheric layers [starting from the farthest to the Earth's surface].

Ⓔ Put (✓) or (x), then correct what is wrong :

1. There is about 50% of the mass of atmospheric air in the area between sea level and 3 km. height.
()
2. The standard atmospheric pressure at sea level equals 76 mb.
()
3. Troposphere layer contains most of atmospheric turbulences.
()

Worksheet 13

Question 1

Ⓐ Complete the following statements :

1. The thickness of stratosphere is, while that of mesosphere is
2. Luminous are formed in mesosphere layer due to its friction with
3. The highest temperature layer in the atmosphere is and the lowest temperature one is
4. The coldest layer in the atmospheric envelope is
5. Van-Allen belts surround

Ⓑ What is meant by ... ?

1. Aurora phenomenon :
2. Van-Allen belts :
3. Exosphere region :
4. Ionosphere :

Ⓒ What happens when there is no ionosphere layer at the end of thermosphere layer?

.....

Question 2

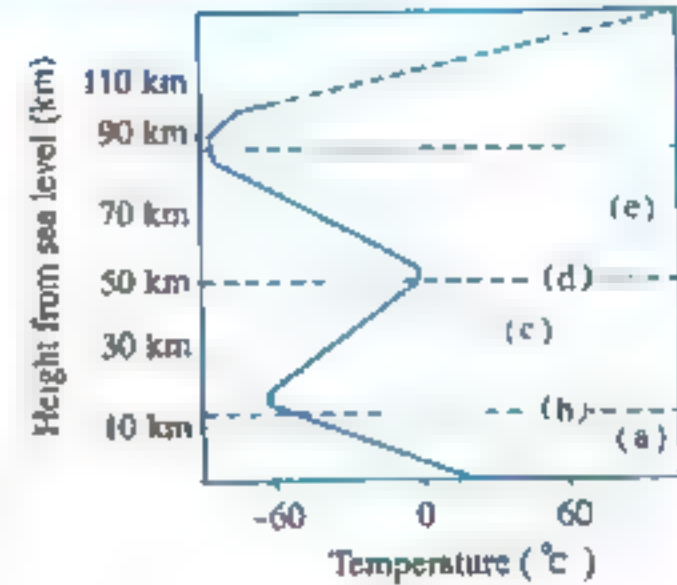
A The opposite figure exhibits the temp. changes in the layers of atmospheric envelope :

1. Replace the letters on the drawing with suitable labels,

2. Which layer is :

(1) The highest in temp. ?

(2) The lowest in temp. ?



B Put (✓) or (✗), then correct what is wrong :

1. Satellites orbit around the Earth in exosphere region.

()

2. The air moves horizontally in the bottom part of stratosphere.

()

3. Troposphere is important for wireless communication.

()

4. Ozone layer is found in thermosphere layer.

()

C 1. Compare between :

The troposphere layer and the ionosphere layer [in the view of : pressure and temperature]

P.O.C.	The troposphere layer	The ionosphere layer
- Pressure :
- Temperature :

2. What is the importance of Van-Allen belts ?

.....

Question 3

A Give reasons for :

1. • The lower part of stratosphere is suitable for flying aeroplanes.

• Pilots prefer to fly their planes in the lower part of stratosphere.

.....

PART

1

2. Ionosphere plays an important role in communication.

3. The temperature increases as we go higher in stratosphere layer.

4. The stratosphere layer is called by ozonic atmospheric envelope.

5. The upper part of thermosphere is called ionosphere.

B Compare between : Troposphere and stratosphere layers. (concerning : temperature and atmospheric pressure)

P.O.C.	Troposphere layer	Stratosphere layer
- Temperature :		
- Atmospheric pressure :		

Question

4

A What is the importance of :

1. Ozone layer :
2. Satellites :
3. Thermosphere :

B Choose the correct answer :

1. The planes fly in layer.
 - a. troposphere
 - b. stratosphere
 - c. mesosphere
 - d. thermosphere
2. layer extends from tropopause to stratopause.
 - a. Troposphere
 - b. Stratosphere
 - c. Mesosphere
 - d. Thermosphere
3. Charged cosmic radiations reflect in layer.
 - a. troposphere
 - b. stratosphere
 - c. mesosphere
 - d. ionosphere
4. Ionosphere is surrounded by two belts.
 - a. magnetic
 - b. ionic
 - c. electric
 - d. heat
5. Meteors are formed in layer.
 - a. mesosphere
 - b. ionosphere
 - c. exosphere
 - d. stratosphere

UNIT TWO

Lesson

2

Erosion of Ozone Layer and Global Warming

Worksheet 14

Question

1

Put (✓) or (x):

1. The ozone molecule is formed by bonding free oxygen atom with an oxygen molecule. ()
2. Ozone layer is located at a height 20 - 30 km. above sea level. ()
3. Far UV penetrate the ozone layer with ratio 100%. ()
4. Erosion of ozone layer and global warming phenomenon are from the dangerous phenomena that face Earth planet atmosphere. ()

Question

2

Write the scientific term :

1. A type of ultraviolet radiations that is absorbed completely (100%) by the ozone layer. ()
2. Thinning or losing parts of ozone layer. ()
3. A kind of gases formed in the stratosphere layer. ()
4. A unit measures the degree of ozone. ()

Question

3

- A Explain with equations the role of ultraviolet radiations in the formation of ozone gas.

.....

.....

- B 1. What is meant by ... ?

Standard temperature and pressure.

.....

.....

2. What is the importance of ozone layer ?

.....

.....

PART

1

Question

4

Complete the following sentences :

1. The ozone layer disperses the rays away from the Earth's surface.
2. The type of ultraviolet rays that penetrate the ozone layer with a ratio 100% is
3. Nanometer = m.
4. In September each year, the quantity of ozone gas because all pollutants regroup and are pushed by wind towards the pole leading to increase the erosion of
5. On formation of ozone layer, the oxygen molecule absorbs which breaks the bond between to make each atom binds with forming the ozone molecule.
6. The erosion of ozone layer increases every year in

Question

5

Give reasons for :

1. Increasing the size of ozone hole in September every year.

.....

.....

2. Formation of ozone layer in the stratosphere layer.

.....

.....

Worksheet 15

Question

1

Mention :

1. The most dangerous pollutants of ozone layer.

.....

.....

2. The reasons for increasing CO₂ gas ratio in the atmosphere.

.....

.....

3. The use of halons.

.....

18

Question 2

A What is meant by ... ?

• IPCC :

B Choose the correct answer :

- is/are used as cooling substance in cooling devices.
 - Methyl bromide gas
 - Halons
 - Nitrogen oxides
 - Freon
- result(s) from the burning of fuel of ultrasound aeroplanes (concorde).
 - Methyl bromide gas
 - Halons
 - Nitrogen oxides
 - Freon
- is/are used as an insecticide to preserve stored agricultural crops.
 - Methyl bromide gas
 - Halons
 - Nitrogen oxides
 - Freon

Question 3

A Explain an activity to show the concept of greenhouse effect :

.....

.....

.....

.....

.....

.....

B What happens when overuse of freon ?

.....

Question 4

A Put (✓) or (x), then correct what is wrong :

- Methyl bromide is used in extinguishing fires.
()
- Methane gas and nitrous oxide are considered from greenhouse gases.
()
- Halogens are produced from ultrasound aeroplanes.
()

PART

1

B Mention the pollutants of ozone layer.

.....

.....

.....

Worksheet 16

Question

1

A What would happen if ... ?

1. Earth's temperature increases [concerning climatic changes].

.....

2. The melting rate of polar ice is increased.

.....

3. The ratio of nitrogen oxides in the atmospheric envelope increases.

.....

4. Infrared radiations don't pass through troposphere layer.

.....

B What is meant by greenhouse effect ?

.....

.....

Question

2

Complete the following statements :

1. and are from the examples of the climatic changes produced by global warming.

2. The ultraviolet radiation has a ... effect, while the infrared radiation has a ... effect.

3. The glass permits the passage of and rays coming from the Sun to be absorbed by Earth in the greenhouse.

4. Global warming phenomenon means

Question 3

A Give reasons for :

1. Melting of ice and snow of both South and North poles.

2. Infrared radiation cannot penetrate the Earth's atmosphere.

3. Burning of fossil fuel should be reduced.

4. Increasing CO_2 gas ratio in the atmosphere.

B Choose the correct answer :

1. Global warming happens because of

- a. the lack of CO_2 in the atmospheric envelope.
- b. the increase of the amount of CO_2 in the atmospheric envelope.
- c. the lack of plants on Earth.
- d. (b) & (c) together.

2. The erosion of the ozone layer differs from a year to another because of ..

- a. amount of pollutants.
- b. the lack of plants on Earth.
- c. the lack of CO_2 in atmospheric envelope.
- d. the lack of ozone gas in atmospheric envelope.

3. The increase of CO_2 percentage is caused by

- a. cutting trees.
- b. burning forests.
- c. burning fossil fuel.
- d. (a), (b) and (c) are correct.

4. Melting of ice in the North and South poles leads to the extinction of polar animals like ..

- a. crocodiles.
- b. deers.
- c. monkeys.
- d. polar bears.

5. Ozone layer doesn't allow the passage of ultraviolet rays.

- a. far
- b. medium
- c. near
- d. (a) & (b) together

6. All of the following gases are greenhouse gases except

- a. CO_2
- b. O_2
- c. N_2O
- d. CH_4

General Exercise of the School Book on Unit (2)

1 Replace each of the following statements by a suitable scientific term :

1. The boundary separating between stratosphere and mesosphere where temperature is rather constant. (.....)
2. Charged layer reflects radio waves. (.....)
3. One of the atmosphere components that its ratio increased in recent years to reach about 0.038 %. (.....)
4. A type of ultraviolet radiation that is absorbed completely (100%) in the Ozone Layer. (.....)

2 Complete the following phrases :

1. The highest temperature layer in the atmosphere is and the least temperature one is
2. Most of weather features occur in layer whereas satellites swim through the layer.
3. Ultraviolet radiation has a effect, and the infrared radiation has a effect.
4. Among the pollutants of the ozone layer are compounds that are used in air conditioning sets and compounds that are used in fire extinguishers.

3 Illustrate with formulas only the role of ultraviolet radiation in the formation of Ozone gas.

.....

4 An aeroplane captain announced that the atmospheric pressure outside the aeroplane is 90 millibar. In which layer of the atmosphere was the plane flying ? Why ?

.....

Workbook

Unit Two

- 5 Compare between mesosphere and thermosphere in terms of temperature, importance, and air pressure.

.....

.....

P.O.C	Mesosphere	Thermosphere
• Temperature :
• Importance :
• Air pressure :

- 6 Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is -6°C :

.....

- 7 What are the similarities between greenhouse effect and global warming ?

.....

.....

Model Exams

on Unit TWO

Model Exam

1

20

Answer the following questions :

Question

1

5 marks

Choose the correct answer :

1. Troposphere contains about . . . % of the mass of atmospheric air.
a. 50 b. 60 c. 75 d. 90
2. The thickness of stratosphere layer is km.
a. 1000 b. 13 c. 50 d. 37
3. layer is surrounded by Van-Allen belts.
a. Troposphere b. Stratosphere c. Ionosphere d. Mesosphere
4. Pilots prefer to fly in the of stratosphere layer.
a. upper part b. lower part c. front d. no correct answer
5. gas is produced from the reaction between sodium bicarbonate and vinegar.
a. CH_4 b. N_2O c. H_2O d. CO_2

Question

2

5 marks

A Put (✓) or (×) , then correct what is wrong :

1. Chlorofluorocarbon compounds are dangerous to the environment.
()
2. Van-Allen belts are called by this name related to the aurora phenomenon.
()
3. Mesosphere is called thermal layer.
()

Worksheets

B Give reasons for :

1. The importance of Van-Allen belts.

2. The upper part of thermosphere layer is called ionosphere.

Question 3 5 marks

A Complete the following sentences :

1. _____ and forests fires are the reasons of increasing greenhouse gases ratio in the atmosphere.

2. _____ is used to determine the possible day weather.

3. The air movement in _____ layer is vertical, while in _____ layer is horizontal.

4. _____ is a region in which the atmospheric envelope is inserted in outerspace.

B What happens when ... ?

1. We go up above sea level. [concerning the atmospheric pressure]

2. Oxygen atom combines with oxygen molecule.

Question 4 5 marks

What is meant by ... ?

1. Freon :

2. Ozone hole :

3. CFC_s :

4. Stratopause :

5. Normal atmospheric pressure :

Answer the following questions :

Question 1 5 marks

Complete the following statements :

1. The statement means that the products don't contain chlorofluorcarbon compounds.
2. don't penetrate ozone layer by a ratio 95 %.
3. Scientist postulated that the thickness of the ozone layer is compressed into 3 mm.
4. Ozone layer is mainly located at a height km above sea level
5. is used by pilots in aeroplanes to measure the elevation above sea level.
6. $O_2 \xrightarrow{uv} \dots + \dots$
 $\dots + \dots \longrightarrow O_3$

Question 2 5 marks

A Choose the correct answer :

1. is the region between mesosphere and thermosphere.
 a. Tropopause b. Stratopause c. Mesopause d. Thermopause
2. 1 bar (b) = millibar (mb).
 a. 100 b. 10 c. 1000 d. 500
3. is/are used as a flating substance in making foam backing.
 a. Chlorofluorocarbon compounds b. Nitrogen oxides
 c. Methyl bromide gas d. Halons

B Give reasons for :

1. Van-Allen belts are called by this name.

.....

2. The stratosphere layer is called by ozonic atmospheric envelope.

.....

Worksheets

Question 3 5 marks

A Correct the underlined words :

1. Water vapour is from ozone pollutants.

2. All pollutatnts of ozone layer assemble as black clouds that are pushed by wind towards the north pole.

3. The thickness of mesosphere layer is 50 km.

B What happens when ?

1. There is no ionosphere layer.

2. Overuse of freon.

Question 4 5 marks

A Mention four examples of greenhouse gases :

1.

2.

3.

4.

B Compare between : Troposphere and mesosphere layers :

Troposphere layer	Mesosphere layer
.....
.....
.....
.....
.....

UNIT THREE

Lesson

1

Fossils

Worksheet

17

Question

1

Choose the correct answer :

- Which of the following terms is the most accurate expression for the traces and remains of old living organisms that were preserved in sedimentary rocks ?
 a. Extinction. b. Red list. c. Fossils. d. Petrification.
- is/are from the suitable conditions for fossil formation of any organism.
 a. A hard skeleton
 b. A medium protects it from decomposition
 c. Buried immediately after death
 d. All the previous answers
- What is the kind of fossil that is formed when a plant leaf falls on a soft sedimentary rock at the beginning of formation, then hardening ?
 a. Trace. b. Mold. c. Cast. d. Petrified fossil.
- Mammoth fossil is an example of fossil.
 a. cast b. mold c. complete body d. petrified

Question

2

A What is the difference between ?

1. Mammoth fossil and amber fossil :

Mammoth fossil	Amber fossil
.....
.....
.....

Worksheets

2. Cast and mold :

Cast	Mold

B Mention :

1. One example for complete body fossil :
2. The suitable conditions for fossils preservation :
3. One example for the trace :

Question

3

Mention the name and the type of each fossil illustrated in the following figures :



Fig. (1)



Fig. (2)



Fig. (3)

Question

4

What is meant by ... ?

1. Amber :
2. Petrification :
3. Fossils :

PART

1

Question

5

A Give reasons for :

1. The petrified woods are considered from fossils although they look like rocks.
.....
2. Naming the petrified forests with wood mountain.
.....
3. Amber is considered a suitable medium for formation of complete body fossils.
.....

B Complete the following sentences :

1. The suitable medium for formation the mammoth fossil is . ..
2. The first mammoth fossil was discovered in .. century which keeps the
3. When the snail shell of . . . decomposes, it will leave . . . which carries the details for the snail.
4. The resinous matter is secreted from . . . which were common during some geologic ages.
5. Fossils always exist in the rocks.

Worksheet 18

Question

1

A Complete the following statements :

1. The presence of microfossils as radiolaria and foraminifera in the rocks of the exploratory wells point to the ... of rocks existed in them and the suitable conditions for exploration.
2. Archaeopteryx represents the link between and
3. Fossils are used in exploration and determining the age of
4. fossil is present in . . . rocks of El-Mokattam's mountain.



B What is meant by index fossils ?

.....

.....

Question 2

Correct the underlined words :

1. Petrified woods are considered from rocks. (..)
2. Nummulites fossil is used in determination the age of sedimentary rocks. (..)
3. Ammonites fossils indicate that the environment where they lived was clear warm shallow seas. (..)
4. Ferns fossils indicate that the environment where they lived was a sea floor. (..)
5. The trace is what the living organism leave after its death in the sedimentary rocks. (..)
6. Worms' tunnels fossil is from remains of an old living organisms. (..)

Question 3

A Give reasons for :

1. Geologists search for foraminifera and radiolaria fossils.
.....
.....
2. El-Mokattam's mountain was a part of a sea floor more than 35 million years ago.
.....
.....

B Mention one use for :

1. Index fossils.
.....
2. Fossils.
.....

Question 4

Choose the correct answer :

- Not all the fossils are considered index fossils, because they are characterized by
 - a long period of time and a limited geographic distribution.
 - a short period of time and a wide geographic distribution.
 - a long period of time and a wide geographic distribution.
 - a short period of time and a limited geographic distribution.
- The fossil record points to the evolution of life from simple to complex in the plants and the proof is that
 - the angiosperms appeared before gymnosperms.
 - the ferns appeared before mosses.
 - the algae appeared before mosses and ferns.
 - the mosses appeared before the algae.
- The fossils that exist in the sedimentary rocks of El-Mokattam's mountain are fossils.
 - ferns
 - coral
 - nummulites
 - all the previous answers
- is an example of microfossils.
 - Mammoth
 - Ferns
 - Foraminifera
 - Coral

Question 5

Choose from column (B) what suits in column (A) :

(A)	(B)
1. Fossils indicate the details of the life of an old plant.	a. Radiolaria.
2. A fossil indicates the suitable conditions for petroleum formation.	b. Archaeopteryx.
3. A fossil is considered a link between reptiles and birds.	c. Corals.
4. Invertebrate fossil was appeared before vertebrates on the life stage.	d. Petrified woods.
	e. Dinosaurs.

UNIT THREE

Lesson

2

Extinction

Worksheet 19

Question

1

A Choose the correct answer :

1. indicate(s) extinction.

- a. Evolution b. Protectorates c. Fossils d. Ecological equilibrium

2. Which of the following statements is the most accurate in describing the concept of extinction ?

- a The date of death of the last individual from the members of the same species.
 b The continuous decrease in the number of the same species without compensation.
 c The path of energy that transmits from a living organism to another in the ecosystem.
 d All living organisms and non-living components in the environment.

B What is meant by ... ?

• Extinction :

Question

2

A Mention the causes of the macro extinction :

.....

.....

.....

B Look at the pictures of these land animals, then mention the name of each one and classify it as extinct or endangered :



(1)



(2)



(3)

.....



(4)

.....

Question 3

A Complete the following statements :

1. is from endangered birds.
2. is an example of endangered plants in Egypt which is used by pharaohs in manufacturing
3. is from extinct mammals, while is from endangered mammals.
4. is from recently extinct birds, while is from recently extinct mammals.
5. From the extinct animals in the old ages are and

B Read these statements, then answer the following questions :

- a. A bird its head is covered with white feathers.
- b. A non-flying bird.

Questions :

1. Name each species ?

.....

2. Determine if it is extinct or endangered ?

.....

.....

Question 4

A Give a reason for :

The dodo bird is an easy target to be hunt.

.....

B Mention one difference between dodo bird and bald eagle.

Dodo bird	Bald eagle
.....
.....

Question 5

Correct the underlined words :

- The desert environment is an example of complicated ecosystem organisms on land. (.....)
- Quagga is from the most famous extinct species in the old times. (.....)
- Dinosaurs are considered from the extinct species in the recent times. (.....)
- Passenger immigrating (pigeon) is from birds that can't fly due to the reduced size of its wings. (.....)

Exercise (20)

Question 1

A Mention three ways to protect living organisms from extinction.

.....

.....

.....

B Give a reason for :

- Complicated ecosystem is not affected by absence of one of its species.

.....

- The desert is a simple ecosystem.

.....

Question 2

Mention one difference between complicated and simple ecosystems.

Complicated ecosystem	Simple ecosystem
.....
.....
.....
.....

Question

3

Complete the following table :

Protectorate	Location	Protected kinds
(1)	South Sinai governorate
(2) Panda protectorate
(3)	Grey bear

Question

4

A What is meant by ... ?

1. Natural protectorates :
2. Food chain :
3. The simple ecosystem :

B Choose from the following scientific terms what is suitable for the short statements .

Scientific terms	The statements
1. The protectorate of petrified forests in Qattamiya.	a. present in nature shaped as a chin.
2. The protectorate of Nile islands in Aswan.	b. in which, the grey bear is protected.
3. Bluestone protectorate.	c. located in northeastern China.
4. Panda protectorate.	d. in which, ibis birds are reproduced.
5. Wadi Hetan, part of Wadi El-Raiyan protectorate in El-Fayoum.	e. in which, the petrified woods are found over 35 million years.
6. Ras Mohamed protectorate.	f. formed from limestone rocks.
7. El-Mokattam's mountain region.	g. the best world heritage areas of whales' skeletons.

1.
2.
3.
4.
5.
6.
7.

Question

5

Put (✓) or (x) :

1. Wadi El Raiyan is the first established protectorate in Egypt in 1983. ()
2. Tropical forest is an example of complicated ecosystem. ()
3. Bluestone protectorate is found in northeastern china. ()

General Exercise of the School Book

on Unit THREE

1 Choose the correct answer :

- Fossils are often found in rocks.
a. metamorphic b. sedimentary c. volcanic d. igneous
- All of the following are endangered species except
a. panda. b. bald eagle. c. quagga. d. rhinoceros.
- All of the following are natural disasters that threaten living organisms except
a. floods. b. volcanoes. c. drought. d. global warming.

2 Define each of the following :

- Fossils :
- Index fossil :
- Natural protectorates :

3 Correct the following statement without changing the underlined phrases :

- The first discovered fossil of mammoth were found preserved in amber.
.....
- Ferns fossils indicate that they lived in mild environment.
.....
- Destroying the habitat is one of the factors that contribute to species adaptation.
.....

4 Mention three ways to protect living organisms from extinction :

-
-
-

5 Give reasons for :

- Petrified woods are considered from fossils although they look like rocks.
.....
.....

PART

1

2. Fossils are important in petroleum exploration.

.....

.....

3. The simple ecosystem is significantly affected by the absence of one of its species.

.....

.....

Which does each of the following represent (mold or cast) ?

1. The mask of superman :

2. Wax Museum statues in Helwan :

3. Cubes of ice :

4. Models of clothes shows :



Model Exams

on Unit THREE

Model Exam

1

20

Answer the following questions :

Question 1 5 marks

Choose the correct answer :

- is an example of complete body fossils.
 - Mammoth fossil
 - Ammonites fossil
 - Nummulite fossil
 - Trilobite fossil
- The replaces the wood material part by part of an old tree.
 - plastic
 - iron
 - silica
 - copper
- indicate (s) the age of sedimentary rocks.
 - Ferns fossils
 - Coral fossils
 - Fossil record
 - Index fossils
- All of the following are extinct species expect
 - dodo bird.
 - quagga.
 - dinosaur.
 - panda bear.
- is considered a link between reptiles and birds.
 - Archeopteryx
 - Algae
 - Gymnosperms
 - Angiosperms

Question 2 5 marks

A Put (✓) or (x) , then correct what is wrong :

- The area of petrified forests in Qattamia is called the wood mountain.
()
- Coral fossils indicate that the environment, where they lived was hot and rainy.
()
- Dinosaur and mammoth are examples of extinct species in recent times.
()

PART

1

B Give reasons for :

1. Snow is suitable medium for formation of complete body fossil.

2. Panda protectorate is an important protectorate.

Question

3

5 marks

A Complete the following :

1. was used by pharaohs in manufacturing of writing papers.

2. is the process of replacing the wood material of trees by silica.

3. and are examples of extinct species.

4. Algae appeared before and

B What happens if ?

1. An organism is buried fast after death in snow.

2. Silica matter replaces wood material part by part of an old tree.

Question

4

5 marks

A Compare between :

Simple ecosystem and complicated ecosystem.

Simple ecosystem	Complicated ecosystem
.....
.....
.....
.....
.....

B Fossils are important because they help in :

1.

2.

3.

4.

Model Exam

2

20

Answer the following questions :

Question 1 5 marks

Complete the following statements :

- is from the mammals that appeared after reptiles.
- indicate that the environment, where they lived was clear warm.
- and are examples of complete body fossils.
- Simple ecosystem has and it is by the absence of one of its species.
- Bald eagle is from species.
- Fossils are and of old living organisms that are preserved in sedimentary rocks.
- is the first established protectorate in Egypt.

Question 2 5 marks

A Choose the correct answer :

- is from extinct species.
 - Panda bear
 - Rhinoceros
 - Quagga
 - Ibis bird
- is the date of death of the last individual of the species.
 - Moment of extinction
 - Extinction
 - Old extinction
 - Recent extinction
- indicates the extinction and evolution of organisms.
 - Index fossil
 - Fossil
 - Fossil record
 - No correct answer

B What happens if ... ?

- Dipping the old insects in amber.

.....

- The absence of one type of species from the simple ecosystem.

.....

PART

1

Question 3 5 marks

A Correct the underlined words :

1. Dodo Birds is an endangered species.2. Reptiles appeared before amphibians.3. In petrification plastic replaced the wood material.

B Give reasons for :

1. Importance of fossils in petroleum exploration.

2. Establishing gene banks of endangered species.

Question 4 5 marks

A Mention two examples of protectorates in Egypt :

1.

2.

B Desert is a simple ecosystem. Explain.

C What is meant by trace ?